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ABSTRACT

The River East Alliance for Developmental Studies (READS) provided occupationally based literacy and numeracy instruction, over 18 months, for 451 entry-level workers, supervisors, and floor managers. The participants were employees from four diverse Connecticut manufacturing companies. During the project, 47 classes in reading, mathematics, and English as a Second Language (ESL) were provided at five sites. Of those who enrolled, 347 or 77 percent completed classes. Participation was voluntary and most classes were scheduled on company time. The overwhelming majority of participants were enthusiastic about READS and wanted additional classes. Many of the supervisors were not supportive of the program, and management took a "top down" approach to most initiatives, leaving a sense of "ownership" of the program with the workers. As the program progressed, the teachers tailored the materials and teaching more closely to workplace needs. Although this was appreciated by the workers, it was difficult to cover all skills measured by the instrument used to evaluate the project. However, supervisors reported worker improvement in skills and self-image and their contribution to shop activities. Because of a poor economy, the READS program was put on hold at most of the companies involved during the latter part of the grant period. (This packet contains the project report, an external evaluation, a "promising practices" program development guide, and a disk-based workplace simulation on developing printed circuit boards.) (KC)

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FINAL REPORT
NATIONAL WORKPLACE LITERACY PROGRAM
GRANT AWARD V198A10146
READS PROGRAM

MANCHESTER COMMUNITY-TECHNICAL COLLEGE
MANCHESTER, CONNECTICUT

Report Submitted by
Ruth L. Scheer
READS Program Director
April 15, 1993

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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INTRODUCTION

The River East Alliance for Developmental Skills (READS), comprised of four Connecticut companies, Pratt & Whitney, J. T. Slocomb Company, Lydall, Inc., and B & B Associates, and Manchester Community-Technical College, was formed for the purpose of providing basic skills training for front-line workers. During the course of the grant period, a total of 47 classes in Reading, Math, and ESL were provided at five sites. Of those who enrolled, 347 or 77% completed classes. Participation was voluntary and most classes were scheduled on company time.

The overwhelming majority of participants were enthusiastic about READS classes and wanted more. They reported that what they had learned was valuable overall and applicable to their jobs.

Of those participating in evaluation interviews, 94% indicated they felt better about themselves as workers; 73% reported they had improved the quality of their work. Based on participant evaluations completed by instructors, 85% of those taking Reading or ESL improved their communication skills; 80% of those taking Math improved their math skills.

Prior to the grant period, Pratt & Whitney was the only company that had offered training for front-line workers. This was limited to those who wanted to develop skills in order to qualify for the Pratt Apprenticeship Program.

The program developed for this purpose by MCTC and Pratt & Whitney initially served as the model for the READS Program. Although it focused on developing the skills needed to learn the technical aspects of higher level jobs, the program was designed from an academic perspective. It presupposed homogeneous groups of participants with respect to basic skill competencies and utilized a traditional sequential approach as its organizational principle.

During the course of the grant period, the READS Program gradually became more workplace- and worker-centered. The use of workplace requirements and workplace materials as the focus for teaching sets of skills increased as did instructors' responsiveness to the self-identified needs of participants.

Ironically, this change in emphasis, which was perceived as desirable and appropriate in light of certain of the grant objectives, conflicted with the primary measurable objective for participants. Their successful completion of the program was tied to improved performance on the TABE. Changing the program focus precluded the possibility of covering all the skill areas tested on the TABE or familiarizing participants with the contexts in which they would be tested. This conflict created a dilemma for everyone.

Although all members of the teaching staff had previous experience working with adults, including some who had taught in the Pratt Pilot Program and others who had taught in management training programs, only two had ever taught basic skills from the perspective of workplace needs. The majority of the 17 instructors involved in the READS Program responded readily to suggested strategies for teaching in the workplace. They were flexible, creative, and resourceful. Without exception, all of the instructors established excellent rapport with participants, allaying fears, helping to build self-confidence, and establishing relationships based on trust.

Building trust was essential since a significant number of supervisors at four out of five sites did not support the Program. Training for front-line workers was a new concept at the smaller companies. While training was part of the culture at Pratt & Whitney, many supervisors in East Hartford continued to be resistant and uncooperative. The absence of

encouragement from supervisors made it all the more difficult for individuals to place themselves in a situation in which their weaknesses would be revealed. Although the confidentiality concerning classroom process and outcomes was emphasized during recruitment, it remained for teachers to help participants overcome negative attitudes that inhibited meaningful learning.

The problems encountered with supervisors during the READS Program were symptomatic of organizational management style and larger organizational problems at partner companies. A representative from one company volunteered that a version of Total Quality Management had been instituted from above at his company with no time taken to build a foundation or to reach a consensus about values. Similarly, the decision to become a READS partner was made by a few top or mid-level managers at each company with no time taken to build broadly-based internal support for the Program or to reach a consensus about program goals. Consequently, a relatively small number of people at each company shared a sense of ownership for the Program. This influenced the strength and stability of company commitment.

READS staff worked with company representatives to facilitate clarification of goals and to encourage broader participation in program planning. Additional time might have yielded more meaningful results. It is significant, however, that by the end of the grant period, two of the smaller companies stated that the positive experience the READS Program had provided laid the foundation for future educational programs. This is as important an outcome for the future health of our workforce as are the accomplishments reported here for individual participants.

NATIONAL WORKPLACE LITERACY PROGRAM
INFORMATION FORM

Part 1. Program Parameters

1 Target No. to be Served 335

2 No. Served at Each Site to Date

Site 1	280	Site 6	
Site 2	36	Site 7	
Site 3	99	Site 8	
Site 4	13	Site 9	
Site 5	17	Site 10	

3 Total No. Served 445

4 Fed Funds Obligated ~~$313,378~~

5 Matching Funds/ In-Kind: $77,481

6 Value Release Time: $86,754

7 No. Participating in Programs Offered:

Basic Skills 372
GED -0-
ESL 79

8 Contact Hours Provided: 2,256

(Contact Hours are the number of teaching hours that workers receive)

Part 2. Participation Data

1 Mean Age Participants 43

2 Sex: No. Males 354 No. Females 90

3 Race Ethnicity No. who are

White	285	Am. Indian	
Black	123	Alaska Native	1
Hispanic	31	Asian/Pacific Islander	13

4 No. Single Head of Household: NA

5 No. Limited English Proficient: 111

6 Outcomes

	No. Participants
a. Tested higher on basic skills	242
b. Improved communication skills	159
c. Increased productivity	NA
d. Improved attendance at work	29
e. Increased self-esteem	130 out of 139

7 Years with the company

	No. Participants
Not Available	
Unemployed	
0-5	
6-10	
11-15	
16-over	

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FINANCIAL STATUS REPORT

(Short Form)

(Follow instructions on the back)

1. Federal Agency and Organizational Element to Which Report is Submitted	2. Federal Grant or Other Identifying Number Assigned By Federal Agency	OMB Approval No.	Page	of
Julius Cotton, Education Grants Staff, U.S. Dept. of Education	V198A0146-91	0348-0039	1	1 pages

3. Recipient Organization (Name and complete address, including ZIP code)

Manchester Community-Technical College
P.O. Box 1046
Manchester, CT 06045-1046

4. Employer Identification Number	5. Recipient Account Number or Identifying Number	6. Final Report	7. Basis
06-6000798	7702-0000-446	☒ Yes ☐ No	☒ Cash ☐ Accrual

8. Funding/Grant Period (See instructions) From: (Month, Day, Year)	To: (Month, Day, Year)	9. Period Covered by this Report From: (Month, Day, Year)	To: (Month, Day, Year)
3-15-91	1-15-93	3-15-92	1-15-93

10. Transactions:	I Previously Reported	II This Period	III Cumulative
a. Total outlays	152,939	294,221	447,160
b. Recipient share of outlays	-0-	131,782	131,782
c. Federal share of outlays	152,939	162,439	315,378
d. Total unliquidated obligations			11,721
e. Recipient share of unliquidated obligations			11,721
f. Federal share of unliquidated obligations			-0-
g. Total Federal share (Sum of lines c and f)			315,378
h. Total Federal funds authorized for this funding period			315,378
i. Unobligated balance of Federal funds (Line h minus line g)			-0-

11. Indirect Expense	a. Type of Rate (Place "X" in appropriate box) ☐ Provisional ☐ Predetermined ☐ Final ☐ Fixed	b. Rate	c. Base	d. Total Amount	e. Federal Share
		8%	318,230	25,458	21,408

12. Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation.

13. Certification: **I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents.**

Typed or Printed Name and Title	Telephone (Area code, number and extension)
James McDowell, Director of Finance and Administrative Services	203-647-6028
Signature of Authorized Certifying Official	Date Report Submitted
	4/12/93

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COMPANY PROFILES

PRATT & WHITNEY: EAST HARTFORD and SOUTHINGTON

Pratt & Whitney is a major manufacturer of jet engines and spare parts for military and commercial aircraft. It is undergoing accelerated restructuring and downsizing due to the decline in military expenditures and the serious deterioration of the commercial airline business worldwide. As of January 1, 1992, P & W employed 23,000 people at its five Connecticut sites. As of October 30, 1992, the number had been reduced to 21,000. It is projected that by June 30, 1993, P & W will downsize its Connecticut workforce to 17,400 or by more than 24%. P & W hourly workers are unionized and represented by the International Association of Machinists.

Until January 1993, the Pratt & Whitney organization included multiple training departments, each of which provided specific services to business unit managers. Employee participation in training of any kind was at the discretion of department supervisors. The cost of educational services was charged back to each department based on the number of participants.

The READS Program was developed in collaboration with the East Hartford Technical Training Department as one part of the Educational Development Program. In December 1992, notice was given that Tech Training departments throughout the company would be dismantled and almost all training staff would be laid off. This hampered the collection of evaluation data at the end of the grant period.

PRATT & WHITNEY: EAST HARTFORD

GOALS

Pratt & Whitney's original goal for the READS Program was to increase the number of eligible employees for apprenticeship programs and to bring all employees up to minimum competency levels of sixth grade reading and eighth grade math as determined by the Test of Adult Basic Education. These criteria were determined through a task analysis undertaken prior to the grant period. The TABE was chosen as the measurement tool because it is a national validated nondiscriminatory test.

During the grant period, but separate from grant-funded activity, a Job Design Process was completed which produced a multi-tiered Hourly Job Rating Plan. A new and more detailed task analysis was undertaken which linked each Job Rating level to a TABE Test level (M, D, or A). At all levels, competency was defined by test performance of 80% or better in reading comprehension, math computation, math concepts and applications, and on the aggregate of inferential and evaluative questions. After this process was completed, the new goal was to bring everyone up to the educational level required by their hourly job rating.

Eligibility for the READS Program paralleled changing goals. Originally the Program was to target those who scored below eighth grade in math and sixth grade in reading. After the Job Design Process was completed, anyone who tested below the TABE requirements for their particular job became eligible for the READS Program. In addition, whereas the original mandate from the company was to give as many employees as possible a single class first and then to provide additional classes for those who needed more help, ultimately

we were directed to work with employees until they could fulfill the TABE requirements for their current job.

Conspicuously absent from Pratt & Whitney's goals in East Hartford was developing the communication skills of employees for whom English is a second language. These individuals were mainstreamed in reading and math classes despite our recommendation that ESL classes be offered. Twenty-five employees who participated in classes were identified as needing ESL instruction.

ON-SITE OPERATION

The READS grant provided a total of 25 classes: 13 Reading and 12 Math. All classes were held on company time and were scheduled to accommodate the day and evening shifts: 123 were enrolled in Reading, 96 completed; 163 were enrolled in Math, 129 completed.

On-site classroom space was adequate but limited due to use for in-house training programs. During most of the grant period READS was restricted to running four classes in each 12-week cycle. The last three classes for recently laid-off workers were held at Manchester Community-Technical College.

The most effective recruitment method was one-on-one with a representative from the training department or with a supervisor. The program had access to the services of two members of the college staff who were on-site at Pratt to help with the apprenticeship program and the pilot project preceding the grant. One worked with employees directly both in recruitment and counseling. The other, a former Pratt supervisor, had excellent relations with his former colleagues and was instrumental in persuading some of them to recruit participants. The two college staff members also did most of the on-site scheduling and coordinating.

The company liaison/coordinator for the READS Program was changed four times during the grant period. Communication during each replacement process was less than ideal.

STRENGTHS

The teaching staff remained fairly constant through six cycles of classes and responded creatively to the needs of increasingly diversified groups of participants. At the beginning of the program, it was assumed that classes would be fairly homogeneous since there were large numbers of participants and the Accuplacer Test was being used for placement. The Accuplacer did not produce the homogeneity anticipated. After Pratt's goals changed, the competencies represented in a given class became even more diverse. Increasingly, learning projects were tailored for small groups and for individuals. For participants who took more than one class, the individualized approach offered the advantage of continuity in instruction. The same was true in cases where participants had to switch class sections because of shift changes.

Despite the wide diversity of specific occupations represented in each class, the overwhelming majority of participants reported that they would be able to use what they learned in READS classes in their jobs.

Several of the math teachers collaborated in piloting and refining a computer program which had been developed to complement classroom instruction. One of the teachers, a retired Pratt engineer, spearheaded the effort to ensure that the software was user friendly. Most of the participants who used the program had positive reactions reporting that it helped to strengthen their math reasoning skills and their ability to work as part of a team.

PROBLEMS

1. Supervisors had no role in planning the program. READS staff was refused access to supervisors after the program began. Therefore, there was no opportunity to explain the program goals or to get supervisor input concerning employee assessment or evaluation. The Tech Training Department refused to distribute assessment and evaluation forms to supervisors citing relations with the union as the reason. Supervisors often refused to allow employees to participate in the program at all and sporadically refused to allow those enrolled to attend classes because of production pressures.

2. The union became involved late in the program. Until March 1992, READS staff was denied access to union representatives (International Association of Machinists). As a result of a new contract negotiated at the end of 1991, the IAM had an education coordinator on site at Pratt & Whitney, East Hartford. In his initial meeting with READS staff, the union representative indicated his lack of support for teacher-led classroom instruction and his preference for computer-assisted instruction. He also requested that we begin to offer services to recently laid-off workers whose benefits included education and training.

3. Computer-assisted instruction in basic skills was begun in January 1992, as a company training initiative distinct from the READS Program.

Permission to use grant funds to support the Computer Learning Center coordinator's position was denied by the U.S. Department of Education. Therefore, the computer center was staffed by the Capital Region Education Council.

As a result, beginning in the late fall of 1991, the READS Program and the Computer Learning Center were competing for the same employee-students.

By April 1992, P & W Tech Training staff were unsure they would be able to recruit enough employees to fulfill the company commitment to the READS Program. At that time, permission was granted by the Department of Education to provide ESL instruction at Pratt's Southington site.

4. There was no access to work-related materials until March 1992, except for instructional modules from Pratt's Shop Math course and a list of work-related vocabulary.

5. The confidentiality of test scores became an issue. Despite a signed letter of agreement, there was not-so-subtle pressure to give Tech Training staff access to individual, as opposed to aggregate, test scores. Since the training department needed constantly to justify the cost effectiveness of its activities, READS staff constructed a comprehensive data base of individual records each identified by a five-digit code. This enabled the training department to track and report progress in fulfilling TABE requirements for current jobs and maintained the principle of confidentiality to which the READS Program is committed.

6. Beginning in the summer of 1992, the fear and stress caused by impending layoffs began to affect participants' attitudes and had a negative impact on the atmosphere in the classroom. Once layoffs became a reality, anger and cynicism surfaced during classes and evaluation interviews. Layoffs also had a negative effect on the class attendance of those who were retained. Departments became understaffed and supervisors more frequently refused to release workers for class.

PRATT & WHITNEY: SOUTHINGTON

GOAL

In contrast to East Hartford, the goal at Southington was clear and unchanging: to develop communication skills of employees for whom English is a second language.

ON-SITE OPERATION

Four ESL classes were provided at this site. All classes were held on company time and scheduled to accommodate two shifts. Supervisors did all the recruiting; the on-site Pratt &Whitney Training Coordinator did all the scheduling and coordinating. It is to his credit that the program in Southington was so successful--36 enrolled and 36 completed.

STRENGTHS

The P&W Training Coordinator recognized the need for ESL training in Southington. He persuaded the Training Department in East Hartford to allow him to offer the program; was an enthusiastic and articulate advocate; and communicated early and well with supervisors and unit managers about the opportunity to offer ESL training.

Due to the initiative of the Tech Training Coordinator, supervisors were involved in the decision to offer an ESL program; in the determination of learning objectives and desired outcomes; in recruiting participants and in reinforcing class activities on the shop floor. Supervisors attended planning and evaluation meetings, collaborated in assessing and evaluating participants, provided work-related materials, and even participated along with their workers in ESL classes.

Testing, placement, and the actual writing of learning objectives was done primarily by an ESL specialist who had previous experience in workplace education.

J. T. SLOCOMB COMPANY

J. T. Slocomb Company is a manufacturer of aircraft engine components, electrochemical deburring equipment, and micrometers. It also is an F.A.A. licensed repair station. At the beginning of the grant, the company had approximately 400 employees. Affected by the same market forces as Pratt & Whitney, there have been significant layoffs. At the beginning of 1993, management revealed that the company was in serious financial difficulty and was working with a bank to develop strategy for rebuilding company finances. The company is also undergoing restructuring. During the grant period there was an unsuccessful attempt to unionize front-line workers.

GOALS

The goal for the READS Program was to upgrade employees' reading, writing, communication, and math skills as related to their jobs and to their lives outside work. Job-related goals included developing skills to understand how to use new machinery, to communicate better orally and in writing with supervisors and fellow workers, and to prepare for an apprenticeship program which the company planned to revive.

ON-SITE OPERATION

Eleven classes were provided: 3 in Reading, 3 in Math, and 5 in ESL; 99 enrolled, 62 completed. The retention rate for ESL participants was considerably higher than for others. Classes were scheduled to accommodate both shifts, half on company time and half on

personal time. Classroom space was adequate some of the time but there were instances in which classes were "bumped" and forced to use space that afforded no privacy.

The on-site liaison/coordinator, an assistant in the Human Resources Department facilitated READS staff shop-floor recruitment efforts, recruited one-on-one herself, publicized the program in the company newsletter, and scheduled and coordinated all aspects of the program. After several visits to the shop floor by READS Staff, 80 employees volunteered for the program. The on-site coordinator recruited additional employees and worked with supervisors to get their cooperation.

STRENGTHS

The on-site coordinator was efficient, persistent and effective. She was a strong supporter of the READS Program and did everything possible to make it a success. The program also had good support from the Director of Quality who supplied company materials for classroom use and the Director of Engineering who did his best to advocate for the program.

Participants were paid for personal time spent in class and offered reimbursement for extra child-care expenses.

Although a significant number of employees volunteered to take the placement test for the program, underlying fear and distrust of management's motives for offering the program surfaced in preplacement counseling sessions. To the credit of the instructors, particularly those teaching ESL, trusting and productive relations were developed with participants. As a result, 20 out of 23 ESL participants took two consecutive classes.

In summing up, one of the teachers observed: "We have learned to communicate with one another because we have spent so much time working on just that. I cannot be sure how well that level of communication can transfer to others. . . . My point is that communication involves more than one person."

PROBLEMS

1. Upper management support for basic skills classes was sporadic.

2. Some supervisors who came up through the ranks considered the program a waste of time and did not support it.

3. Use of the term "literacy" in the grant name created confusion. Management interpreted the word literally and refused to allow a group of employees, who scored 12.9 on a D level TABE but assessed themselves as needing job-related skill development in calculating measurements, ratios, and proportions, to participate in the program.

LYDALL, INC.

Lydall, Inc. is a diversified manufacturer of fiber-based materials for specialty industrial markets worldwide. Its major product areas are filtration, thermal barriers, materials handling, gasketing, and electrical insulation. The company, with corporate headquarters in Connecticut, is highly decentralized. The READS Program served the Lydall & Foulds division which manufactures paperboard cartons and has 46 employees. Lydall was the only business partner that did not have to resort to downsizing during the grant period. At the last partners' meeting, the company representative reported a 24-day backlog on orders.

GOALS

The original priority was to improve the communication skills of employees for whom English is a second language. Due to circumstances described below, the program goal focused on upgrading reading and math skills.

ON-SITE OPERATION

Classes were held on company time and scheduled to accommodate rotating shifts. At Lydall, entire shifts rotate every four weeks. To make it possible for employees to take 12 consecutive weeks of classes, one teacher taught two sections of Reading with one class on each shift. In the second cycle, another teacher taught two sections of Math with one class on each shift. Individuals rotated between class sections as they rotated shifts.

Six enrolled in Reading; 5 completed. Eleven enrolled in Math; 10 completed.

The space designated for classes was appropriate and available for READS classes on a regular basis.

The Personnel Manager served as the on-site liaison-coordinator. She played an active role in initial meetings with management and supervisors, assisted supervisors with recruitment, did all the scheduling, and gathered company materials for classroom use.

STRENGTHS

The Program at Lydall was highly individualized. Instructors successfully addressed the diverse needs of participants whose TABE grade equivalent scores ranged from first grade on the E level to 12.9 on the A level. Using the READS math software with such a diverse group proved to be an exercise not only in problem solving and in the application of math skills, but also in cooperative learning.

As the Program proceeded, workers developed a more positive attitude towards classes. During the second cycle, class size doubled to 10.

Despite the diversity of skill levels and specific occupations represented in each class, the retention rate at Lydall was considerably higher than at all but one other site. Additionally, the overwhelming majority of participants reported that they would be able to use what they learned in READS classes in their jobs.

The on-site liaison/coordinator assumed the responsibility for ensuring that participants attend class. In several instances, she had to intervene with supervisors who were refusing to release their workers.

PROBLEMS

1. The attempt to set up a company-wide program planning committee did not succeed.

2. Although management and supervisor representatives were involved in program planning, no one represented front-line workers or the union. ESL instruction was identified as a priority and supervisors recruited those whom they knew had language difficulties. Several ethnic groups were involved. The largest group chose to boycott the program. Since there were not enough employees left to form an ESL class, the focus to was changed to work-related reading and math.

3. Some supervisors did not support the Program. They thought it was an excuse for workers to take time off. In some cases, they would not allow workers to go to class until pressured by the on-site coordinator. Late arrivals and early departures disrupted classes.

4. Participants balked at using all job-related reading materials; the instructor introduced some general reading materials which revived participants' interest.

5. There was considerable absence from class due to on-the-job training and production demands.

B & B ASSOCIATES

B & B Associates is a family-owned printing company specializing in newspaper advertising inserts. The company is not unionized. During 1991, there were 220 employees even though the company experienced seasonal declines in sales. However, in 1992, sales declines were prolonged with resulting lay-offs and financial difficulties. Many who were laid off were eligible for the READS Program. As part of a company restructuring, one of the company READS liaisons lost his job.

GOALS

To upgrade entry-level employees' reading, communication, and math skills in order to qualify them for advancement in the company.

ON-SITE OPERATION

Three classes were provided at this site: 1 in ESL and 2 in Math. Four enrolled in ESL; 2 completed. Nine enrolled in Math; 7 completed. Classes were held on company time at various times in the morning.

The original space set aside for classes was adequate but not available on a regular basis. Other spaces in which classes were held were totally unsuitable.

The original on-site liaison/coordinator was a member of the Human Resources Department and a daughter of the company owner. Subsequently, she shared the coordinating functions with a newly-hired Director of Human Resources. Together they facilitated on-site recruiting by READS staff, interfaced with upper management and supervisors, and did all the scheduling.

STRENGTHS

The on-site coordinators were strong advocates of the Program. They personally recruited participants and persuaded some supervisors to cooperate.

The Director of Human Resources attended some ESL classes; the other coordinator participated in Math classes.

The program at B&B was highly individualized and successfully addressed the needs of a limited English speaker and a wide range of skill levels in a single Math class. All participants who completed classes reported that they would be able to use what they learned in READS classes in their jobs.

PROBLEMS

1. The attempt to organize a program planning committee did not succeed.

2. At a partners' meeting eighteen months into the READS Program, liaison/coordinators reported, "Management still doesn't butt into education and training; doesn't think it matters. . . . We're behind."

3. At the same meeting, their comments about supervisors: "Supervisors themselves learned by osmosis. They place no value on education. They see machines as more important than the man."

4. Supervisors often made it difficult for participants to attend classes. There were frequent instances of late arrival and early departure. This impeded participants' progress.

5. Company layoffs affected many who would have been candidates for the READS Program.

READS PROGRAM

TYPES AND NUMBERS OF CLASSES

CLASSES	Pratt & Whitney	Slocomb	Lydall	B & B	TOTAL
Reading	12	3	2	0	17
Math	13	3	2	2	20
ESL	4	5	0	1	10
TOTAL	29	11	4	3	47

Each class met for two hours, twice a week for 12 weeks.

TOTAL CONTACT HOURS: 2,256

READS PROGRAM
FINAL ENROLLMENT STATISTICS
BY COMPANY

TARGET NUMBER TO BE SERVED: 335

COMPANY	TOTAL ENROLLED	TOTAL COMPLETED	TOTAL DID NOT COMPLETE
Pratt & Whitney-East Hartford			
Reading	123	96	27
Math	163	129	34
Subtotal	286	225	61
Pratt & Whitney-Southington			
ESL	36	36	0
J.T. Slocomb Company			
Reading	30	17	13
Math	30	15	15
ESL	39	30	9
Subtotal	99	62	37
B & B Associates			
ESL	4	2	2
Math	9	7	2
Subtotal	13	9	4
Lydall, Inc.			
Reading	6	5	1
Math	11	10	1
Subtotal	17	15	2
TOTALS	451	347 (77%)	104 (23%)

Reasons for not completing:

Information not available	25
Production pressure/Supervisor refusals	18
Laid Off	16
Terminated, retired, transferred	11
Illness/Personal Problems	10
Class level inappropriate	7
Absences	5
Never showed	5
Other such as jury duty	4

Among the Pratt & Whitney unemployed group, 3 dropped because they found new jobs which conflicted with their class time.

READS PROGRAM PARTICIPATION DATA

TOTAL ENROLLMENT

AVERAGE AGE	P & W	Slocomb	Lydall	B & B	TOTAL
# of Respondents	303	95	17	12	427
Average Age	44	41	34	34	43
RACE/ETHNICITY					
White	153	70	6	6	235
Black	106	8	7	2	123
Hispanic	52	12	2	5	71
American Indian	0	0	1	0	1
Asian	4	9	0	0	13
Total Respondents	315	99	16	13	443
SEX					
Male	235	92	17	10	354
Female	80	7	0	3	90
Total Respondents	315	99	17	13	444

PARTICIPANTS WHO COMPLETED

AVERAGE AGE	P & W	Slocomb	Lydall	B & B	TOTAL
# of Respondents	242	59	16	9	326
Average Age	44	40	34	36	43
RACE/ETHNICITY					
White	122	48	6	5	181
Black	84	3	6	2	95
Hispanic	48	5	1	2	56
American Indian	0	0	1	0	1
Asian	2	7	0	0	9
Total Respondents	256	63	14	9	342
SEX					
Male	196	58	15	7	276
Female	63	5	0	2	70
Total Respondents	259	63	15	9	346

PARTICIPANTS WHO DID NOT COMPLETE

AVERAGE AGE	P & W	Slocomb	Lydall	B & B	TOTAL
# of Respondents	61	36	1	3	101
Average Age	43	42	35	28	42
RACE/ETHNICITY					
White	31	22	0	1	54
Black	22	5	1	0	28
Hispanic	4	7	1	3	15
American Indian	0	0	0	0	0
Asian	2	2	0	0	4
Total Respondents	59	36	2	4	101
SEX					
Male	44	35	2	3	79
Female	17	2	0	1	20
Total Respondents	61	37	2	4	104

PARTICIPANTS WITH LIMITED ENGLISH PROFICIENCY

79 were enrolled in ESL classes
68 completed classes
32 mainstreamed in Reading and Math also completed

TEST DATA

The original testing procedure involved using the ETS Accuplacer for placement and TABE for pre- and posttesting. Accuplacer did not produce homogeneous classes as intended. Once placed, individuals scoring within a narrow range demonstrated very different competency levels.

The TABE Locator also proved unreliable in prescribing appropriate TABE levels. There were frequent instances of examinees achieving the highest possible grade equivalent on the prescribed pretest.

In early cycles, entire classes took the same level pre- and posttest. Consequently, for those who got maximum scores on the pretest, there was no way to show quantifiable progress.

In later cycles, a total of 103 participants took higher level TABE tests. Some students who took "M" pretests took "D" or "A" posttests and scored at the same grade equivalent on both. For reporting purposes, again, these individuals made no progress. However, this contradicts individual learning objective evaluations and instructors' narratives detailing observations of participants which were based on class activities, quizzes, and homework.

As the use of work-related materials increased in the classroom, the TABE became less and less relevant as a measure of progress. If we accept the idea that there is very little transfer of skills acquired in an academic context to the world of work, then should we not also assume the opposite? Our classes did not deal with interpreting poetry or with points of view implicit in a text. Nor did we deal with interest rates or how long it would take to get from point A to point B at a given rate of speed. I will not belabor the point since I know this problem has been reported many times before.

The BEST was used for ESL participants. It was adequate for measuring progress with respect to the use of everyday language, but as with the TABE, did not test work-related learning.

READS PROGRAM

GOAL: 75% of 335 workers will complete training successfully.

INDICATORS: Increase one level on the TABE,* enroll in a GED class, or be promoted.

POSTTEST DATA

COMPANY	TOTAL COMPLETED	TEST DATA COMPLETE	POSTTEST INCREASE ≥1 GRADE LEVEL	POSTTEST INCREASE <1 GRADE LEVEL
Pratt & Whitney-East Hartford				
Reading	96	94	52	20
Arithmetic	129	111	69	18
Pratt & Whitney-Southington				
ESL	36	36	21	NA
Subtotal	261	241	142	38
J.T. Slocomb Company				
Reading	17	17	9	5
Arithmetic	15	15	11	1
ESL	30	28	20	NA
Subtotal	62	60	40	6
B & B Associates				
ESL	2	2	2	NA
Arithmetic	7	7	2	5
Subtotal	9	9	4	5
Lydall, Inc.				
Reading	5	5	1	0
Arithmetic	10	8	3	3
Subtotal	15	13	4	3
TOTALS	347	323	190 (59%)	52 (16%)

*The BEST was used for ESL participants.

We have incomplete test data for 24 participants due to circumstances such as: employee emergencies or illness on day of posttest; layoffs or shift changes during last two weeks of a class cycle; and loss of one set of pretests in an automobile accident.

OTHER INDICTORS

	P & W	Slocomb	Lydall	B & B	TOTAL
Promotion	17	1	1	4	23
Pursuing GED	15	1	3	1	20

DATA COLLECTION FOR OUTCOMES AND EVALUATION

During the first cycle of classes at Pratt & Whitney only TABE scores were compiled. One instructor gave four quizzes but no TABE tests (12 participants).

In subsequent cycles, after the project director was hired and a planning meeting had been held with the outside evaluator, data was collected as follows:

1. Participant Pre-Evaluation Questionnaire was administered during first or second class. Different formats were used for basic skills and ESL.

2. Supervisor Pre-Evaluation Questionnaire was circulated as soon as classes were formed (no input from Pratt & Whitney - East Hartford).

3. Participant Course Evaluation was completed in class during last week of cycle.

4. Instructor Observation of Participants: A narrative was completed by the instructor for each individual at the end of each cycle.

5. Learning Objectives evaluation was completed at the end of each cycle for each individual beginning April 1992. Different formats were used for basic skills and ESL.

6. Participant Post-Evaluation Questionnaire was used as basis for individual interviews 90 days after participants completed class. For classes ending October - December 1992, interviews were held sooner.

7. Supervisor Post-Evaluation Questionnaire for each participant was circulated 90 days after class completion. For classes ending October - December 1992, questionnaires were circulated sooner (no input from Pratt & Whitney - East Hartford or B & B).

8. Information was also collected at quarterly partner meetings, supervisor meetings at Pratt & Whitney - Southington, in interviews with company liaisons and management, and from a grant-end partner survey.

9. The outside evaluator attended partner meetings, observed instructors, and communicated frequently with the project director to provide feedback and to keep up with changes in the program.

10. Factors Affecting Number of Participants in Post-Evaluation Interviews:

    - Layoffs.
    - Supervisor refusal to release workers for interviews.
    - At J. T. Slocomb, one post-evaluation interview was conducted for ESL students who took two consecutive classes.
    - At Lydall, one post-evaluation interview was conducted at the end of the second cycle. Everyone in the first cycle enrolled in the second. The first cycle ended in August 1992; the second cycle ended in November 1992.

READS PROGRAM

OTHER PARTICIPANT OUTCOMES

	P & W E. Htfd.	P & W Southgtn	Slocomb	Lydall	B& B	TOTAL
Improved communication skills	89/96	28/36	38/47	3/5	1/2	159/186
*Improved math skills	107/129	NA	14/17	6/10	4/7	131/163
*Improved the quality of my work	84/107	NA	8/17	4/10	5/5	101/139
*Feel better about myself as a worker	104/107	NA	12/17	9/10	5/5	130/139
*Have accepted additional responsibilities	42/107	NA	4/17	2/10	2/5	50/139
*Have improved my attendance	27/107	NA	1/17	1/10	0/5	29/139

*These items were not included on ESL participant questionnaires.

SOME OUTCOMES REPORTED BY PARTICIPANTS IN ANSWER TO OPEN-ENDED QUESTIONS

"I feel as though I have learned how to regroup my thought processes, so as to go on to solving application problems more easily."

"Learned to find main idea and learned listening skills applicable to everyday situations--able to use these techniques to solve problems."

"Giving me more confident in my approach to speak with someone for any problem." "To understand what I read and relate it to the workplace."

"I've learned a lot about Slocomb vocabulary and the meaning of all the hard words that we read in newspaper articles."

"Learn more about how to write note and leave a message to another, specially how to communicate with the supervisor."

"Getting over the fear I have of working with numbers."

"I wasn't afraid to ask questions which he (the instructor) answered to the fullest until I understood how or why we would come to the correct answer."

"Classes helped motivate me to come to work."

"Class gave me increased skills and allowed me to have more duties on the job."

"I've been able to do things I didn't feel I could do."

READS PROGRAM
OBJECTIVES AND ACCOMPLISHMENTS

1. *Successful, collaborative relationships between ERA members and state, community, and volunteer agencies to provide workplace skills will increase by 50%.*

At the three smaller companies, information about community Adult Ed programs was made available to employees for the first time during the READS Program.

READS staff compiled information about services offered by Adult Ed Programs in 30 area communities. This information was made available to program participants during individual counseling sessions. Adult education program services were utilized by 20 employees who decided to pursue a GED.

During the course of the READS Program, Pratt & Whitney established computer learning centers for basic skills remediation at each of its Connecticut sites. The Capital Region Education Council (a regional consortium) was called upon to staff these centers. This was a new collaboration for Pratt & Whitney.

Additionally, one partner company received Department of Labor funds for higher level basic skills training outside the province of the READS Program.

2. *75% of instruction can be tailored to meet specific occupational needs.*

The Pratt & Whitney curriculum, which served as a point of departure for curriculum development in the READS Program, utilized traditionally sequenced basic skills instruction in math, reading, and writing. The curriculum was designed to prepare employees, grouped in classes according to basic skill competencies demonstrated on the ETS Accuplacer Test, for entry into the Pratt & Whitney apprenticeship program.

No attempt was made to transform this curriculum into one that is *occupationally specific*. Since classes were offered primarily on company time, it was impossible to organize classes based on occupation. It also was too costly to do a detailed literacy task analysis for every job represented. As an illustration, consider that 10 occupations were represented in a reading class of 12; 13 occupations were represented in a math class of 18.

However, using information gathered from each company's task analysis, from a review of work-related materials and from the analysis of TABE objectives, a menu of learning objectives was developed for reading, writing, math, and ESL, which utilized company-specific materials and problem-solving. Some of these objectives were also present in the original Pratt & Whitney curriculum.

Teachers were encouraged to choose the objectives that matched the needs of each participant as determined by the TABE (or BEST) and by participants' self-assessments related to their workplace. When there was access to supervisors, they also contributed to the development of learning objectives.

In the early stages of the program, instructors tended to depend more on textbooks than on work-related materials as the basis for classroom activities. As the result of teacher development workshops (one for math and reading instructors; one for ESL instructors) and of informal coaching by program staff, this balance gradually shifted. Textbooks

continued to be used principally for reinforcement and drill. The proportion depended on the needs of individual participants.

Some life skills and general education learning materials and activities were also included when specifically requested by participants, or in cases where skill needs were extremely basic, or for reinforcement.

To complement classroom activities, a computer simulation was developed using a situation specific to manufacturing industries. This computer program required participants to work in teams to read, interpret, and solve the problems presented. The software was used in math classes from May 1992 to the end of the program.

3. *100% of the companies involved will have cost savings and improved quality of life for the employee.*

Excerpts from partner company correspondence, interviews and comments at partners' meetings:

J.T. Slocomb Company: "Productivity evaluation is difficult because we did not have a measure of employee productivity for comparison prior to the READS Program. . . ." "Time savings should be appreciated due to improved understanding of what to do instead of receiving instructions, help, and/or assistance from co-workers. . . ." "It is expected that the effectiveness of READS for these individuals will be demonstrated in our upcoming Introduction to the Certified Operator Program."

"READS Program laid the foundation for future education programs by helping to develop a more positive attitude throughout the company towards learning." This was corroborated by four managers including the Director of Quality Assurance and the Director of Engineering. The READS liaison in the Human Resource Department said, "Classes are definitely on the agenda now; this is a big step for the company."

B & B Associates: "During recent performance evaluations, three READS participants were noted for measurable waste reduction. One person has moved up two levels of craftsmanship in the pressroom. Overall, four out of the nine participants have been promoted to a higher skill level."

Lydall: "All program participants are now in a better position to be eligible for promotions." Supervisors reported that 13 out of 15 READS participants improved the quality of their work and feel better about themselves as workers.

"The READS Program established the foundation for future educational programs, provided on-site solution to the rotating shift problem."

During the final evaluation meeting for the ESL Program at *Pratt & Whitney in Southington*, supervisors shared the following observations:

- Participants are contributing more in quality circles.
- They are asking more questions on the shop floor.
- Leadmen can now speak English rather than Polish more of the time.
- Relationship between supervisors and participants has improved.

Pratt & Whitney in East Hartford did not respond to the READS evaluation survey, nor did we have access to supervisory evaluation.

4. *100 % of the manufacturers involved in ERA can work together and provide for and benefit their workers and the local economy.*

The READS Program provided the first opportunity for partner companies to exchange information about the need for developing the basic skills of their workforce and for sharing ideas about how best to provide education services.

ERA members met every three months to discuss successes and problems in their respective workplace skills programs. Each company hosted one of these meetings at their own site. During these meetings there was discussion of:

- Strategies for removing the stigma associated with basic skills enhancement.
- Strategies for recruiting participants.
- Conflict between need to meet production quotas and scheduling classes on company time. This problem was especially acute at the three smaller companies.
- Need for educating supervisors about how their interests are served by a workplace skills program.
- Need for strengthening commitment from upper management.

The April 1992, meeting of this group featured a presentation by the Director of Workforce Transition at Pitney-Bowes, a company located in southern Connecticut. His description of how the successful Pitney-Bowes basic skills program got started and how it works provided a basis for discussion among partner companies and a source of ideas for improving program development at each company. In addition to each company's READS coordinator, managers responsible for production, finance, and quality control also attended this meeting.

During the grant period, all of the partner companies benefited their workers by supporting the READS Program financially and by offering classes all or in part on company time. The actual in-kind contribution for diverted labor costs was $86,750 or $10,350 in excess of the required amount.

During the later part of the grant period, the Connecticut economy worsened dramatically. Three of the four partner companies were in serious financial difficulty, laying off both front-line and managerial employees, and literally struggling to figure out how to survive. Under these circumstances, the READS partnership has been put on hold.

5. *A 50% increase of the awareness of the lack of workforce literacy skills and ramifications locally and at the state level.*

Enclosed is a list of READS Program dissemination activities. It includes newspaper publicity, conference presentations, and a guide for developing workplace programs.

There has been increased discussion about the need for basic skills training at local and regional Chambers of Commerce meetings. It also was discussed at the New Connecticut Conference held in October 1992.

Unfortunately, few basic skill program initiatives have been undertaken recently due to the poor economy and lack of available funds.

READS PROGRAM DISSEMINATION ACTIVITIES

"MCC Teams With Businesses To Improve Employee Literacy," in *Hartford Journal Inquirer*, May 11, 1991.

"Grant Helps MCC In It's War On Illiteracy," in *Manchester Herald*, May 11, 1991.

"Community College, Partners Get Grant," in *The Hartford Courant*, May 13, 1991.

Informal presentation at The Adult Literacy Resource Institute Teacher-Sharing Workshop, Roxbury Community College, Boston, MA, April 24, 1992.

"Chamber Taking Part in Education Effort," in *The Hartford Courant*, May 7, 1992.

"READS Program Upgrades Workplace Skills," in *Learning Briefs*, Continuing Education Newsletter, Manchester Community College, Manchester, CT, Fall, 1992.

The New Connecticut . . . Help is Here, Conference for East of the River Connecticut Businesses, sponsored by East of the River Chambers of Commerce Association, Manchester Community College, Senator Mike Meotti with the Hartford Business Outreach Center, held at Manchester Community College, October 30, 1992.

Promising Practices: A Guide for Developing Basic Skills Training in the Workplace, Manchester Community College, Manchester, CT, January 1993. A 24-page step-by-step guide distributed to Connecticut Chambers of Commerce, businesses, and education providers.

Dangerous Liaisons: Players, Pitfalls, and Promises in Developing Basic Skills Programs With Business Partners, presented at Connecticut Association of Adult and Continuing Education Annual Conference, Stamford, CT, March 25, 1993.

DEPARTURES FROM TARGET DATES

1. Program Director was hired in July rather than in May because of time needed to fulfill Connecticut Community College system procedural requirements.

2. Case Manager and Secretary were hired in August rather than in May to give the Program Director an opportunity to participate in the process.

3. Meetings with management to assess needs and clarify goals at the three smaller partner companies did not begin until after the permanent program Director was hired. In addition, there were internal problems at two of the companies which further delayed the beginning of classes.

   J. T. Slocomb: Meetings end of August; literacy task analysis, recruitment, testing, etc., in September; classes began in October 1991.

   Lydall: The company liaison-coordinator was ill from August to October 1991. There was no replacement. Meetings and task analysis took place November - December 1991. False start with ESL; recruitment problem due to absence of worker/union involvement. Classes actually began May 1992.

   B& B: Initial meetings and task analysis completed in September 1991. Program repeatedly postponed because of seasonal production pressures, layoffs, and restructuring. Classes began in January 1992.

4. A four-month no-cost time extension was requested in March 1992. The problems at the two smaller companies were a factor. However, the principal reason was the limitation of classroom space at Pratt & Whitney, coupled with recruitment problems that developed after the Computer Learning Center was established. This made it impossible to serve 250 workers within the original grant period.

5. Despite problems and delays, all of the services described in the grant proposal were provided and the number of participants served exceeded the goal.

RECOMMENDATIONS

FROM READS PARTNER COMPANIES

1. Conduct classes for supervisors *before* beginning a basic skills program for hourlies.
2. Allow one year lead time to "talk up" the program throughout the company and to get everyone on board.
3. Need better balance between work-related and liberal arts materials.
4. Should incorporate personal skills and goals; must consider the *whole* person.
5. Give project director more flexibility in decision making; our needs change.
6. Computer skills are basic; should be allowed.

FROM READS STAFF

1. Allocate separate funding for pre-program planning grants. Minimally require a discrete planning budget and narrative as part of the Workplace Literacy Grant proposal.
2. Encourage the development of workplace instructors who can teach both both reading and math skills. The workplace often requires that these skills be used consecutively.
3. If grant goals must be quantifiable, require a description or quantification of the base line to be used for comparison in every category.
4. From a dedicated teacher: "Supervisory pre-evaluations inevitably state that oral instructions are a weakness, yet the fault is always placed with the ESL student. Is it not possible that the supervisor does not speak clearly or slowly, or even changes his thought in mid-sentence, precluding simple repetition of the directions? Perhaps supervisors could be given a concurrent mini-course in communication as well. The people who write the memos could also benefit from instruction: they seem to be unaware of the reading levels of those expected to read the memos. Every memo issued needed to be simplified, rewritten, and explained to my students. If a company wants to have improvement in its communication, it needs to look at the senders of the messages as well as the receivers."

River East Alliance for Developmental Studies (READS) Evaluation

March 1, 1991 - January 15, 1993

National Workplace Literacy Program Catalog Number 84-198
United States Department of Education
Office of Vocational and Adult Education

Submitted by Ira Mozille

April 30, 1993

READS Evaluation

Introduction

The aim of the River East Alliance for Developmental Studies (READS) was to provide occupationally-based literacy and numeracy instruction, over 18 months, for 335 entry level workers, supervisors, and floor managers. The participants were employees from four diverse Connecticut manufacturing companies located east of the Connecticut River near Hartford, Connecticut. The four partner companies form the East of the River Alliance (ERA).

Goals

As stated in the grant, "The major purpose of the READS program is to strengthen the workforce of the (READS) partners. This strengthening promotes a competitive workforce both nationally and internatinally, which in turn produces a stronger economy for Connecticut, at a time when it most needs it."

Specifically, READS' goals were:

1) Successful, collaborative relationships between ERA members and state, community, and volunteer agencies to provide workplace skills will increase by 50%.

2) 75% of instruction can be tailored to meet specific occupational needs.

3) 100% of the companies involved will have cost savings and improved quality of life for the employee.

4) 100% of the manufacturers involved in ERA can work together and provide for and benefit their workers and the local economy.

5) A 50% increase of the awareness of the lack of workforce literacy skills and ramifications locally and at the state level.

6) A measurable goal is to have 75% of the 335 workers (251) successfully complete training. Success will be defined as increasing one level in math and reading (as measured by TABE), enrolling in a GED class or post-secondary education, or promotion."

Partner Companies

The four partner companies were: Pratt and Whitney Aircraft, a major manufacturer of jet engines and spare parts for military and commercial aircraft; J.T. Slocomb Company, a manufacturer of aircraft engine components, electrochemical deburring equipment, and micrometers; Lydall, Inc., a diversified manufacturer of fiber-based materials for specialty industrial markets worldwide; and, B&B Associates, a family-owned printing company specializing in newspaper advertising inserts.

READS Staff

Ruth Scheer, Director
Maureen Pohl, Case Manager/Coordinator
Hal Boretz, Counselor (resigned October, 1991)
Phil Drasner, Counselor (hired in January, 1992)
Walt Gale, Pratt and Whitney Aircraft On-site Counselor, MCC
Jackie Bracey, Pratt and Whitney Aircraft On-site Counselor, MCC
Mary Federchuck, Secretary (resigned December, 1992)
Dorothy Fogarty, Secretary (hired in January, 1993)
Dianne McHutchison, Director, Off-Campus Programs, MCC
Jack Gannon, Dean, Continuing Education, MCC

Partner Company Representatives

John James, Pratt and Whitney Aircraft, East Hartford
Mary Moran, Pratt and Whitney Aircraft, East Hartford
James Wall, Pratt and Whitney Aircraft, East Hartford
Jack Petrucelli, Pratt and Whitney Aircraft, Southington
April Decker, J.T. Slocomb Company
Roberta Hublard, Lydall, Inc.
Gail Bosquet-Hiller, B&B Associates
Doug Gillette, B&B Associates

Background Information

Reference READS Final Report in the Appendix for detail on partner company descriptions and goals, on-site operations, strengths, problems, types and numbers of classes, final enrollment statistics, participation data, test data, data collection procedures, other participant outcomes, objectives and accomplishments, departures from target dates, and recommendations.

Format

The following evaluation reports instructional, operational, and partnership findings by measurement tool and compares the findings to READS' grant goals.

Measurement Tools

Reading and Math Workplace Skills Course Evaluation
ESL Workplace Skills Course Evaluation
Test of Adult Basic Education (TABE)
Basic English Skills Test (BEST)
Learning Objectives Evaluation
Instructor Observations of Participants
Instructor Feedback
Instructor Self-evaluation
Evaluator's Site Visits/Course Design Review
Math Participant Pre- and Post-Evaluation
Reading Participant Pre- and Post-Evaluation
ESL Participant Pre- and Post-Evaluation
Supervisory Reading and Math Pre- and Post-Evaluation
Supervisory ESL Pre- and Post-Evaluation
READS Final Report
READS Monthly Activity Monitoring Reports
READS Cycle Reports
Partnership Focus Group Discussion
Contributing Partner Survey

The evaluation presents the purpose of each measurement tool, the process for administering it, and the findings.

Appendix

The Appendix contains blank copies of the above measurement tools, READS' Final Report, and a list of READS' dissemination activities.

Measurement Tool

Reading and Math Workplace Skills Course Evaluation
ESL Workplace Skills Course Evaluation

Purpose

To record the participants' reaction to READS courses.

Process

294 out of 347 participants, or 85%, submitted Reading and Math Workplace Skills Course Evaluations. The findings represent a cumulative total of course evaluations submitted by participants in all four partner companies. The numbers that follow each question represent the number of participant responses for that question. The first group of responses came from reading and math participants. The second group of responses came from ESL participants.

Reading and Math Participants

Pratt and Whitney Aircraft: 225 reading and math participants completed the program. 182 participants submitted course evaluations. The main reason for the large difference is that I introduced the course evaluations prior to the implementation of Cycle 2. Therefore, no course evaluation data exist for Cycle 1.

Lydall, Inc.: 32 math and reading participants completed the course. 13 participants submitted course evaluations.

B&B Associates: 7 math participants completed the course. 7 participants submitted course evaluations.

J.T. Slocomb Company: 32 math and reading participants completed the course. 27 participants submitted course evaluations.

The total number of submitted reading and math Workplace Skills Course Evaluations is 229.

Findings

1) How did you find out about the course?

The respondents answered as follows: Supervisor/Manager: 101; Company Newsletter: 45; Human Resource Department: 42; No Answer: 13; Word of Mouth: 11; Other: 17.

2) Were the learning objectives clearly stated at the beginning of the course?

The respondents answered as follows: Yes: 207; No: 13; Not Sure: 3; No answer: 6.

3) Did the following parts of the course relate to your needs on the job?

The respondents answered as follows: a) Learning Objectives Yes: 184; No: 12; Not Sure: 13; Not Applicable: 14; No Answer: 6; b) Major Topics Yes: 155; No: 22; Not Sure: 16; Not Applicable: 22; No answer: 14; c) Learning Activities Yes: 177; No: 13; Not Sure: 11; Not Applicable: 19; No Answer: 9; d) Handouts Yes: 166; No: 16; Not Sure: 16; Not Applicable: 15; No Answer: 16.

4) How was the pace of the course?

The respondents answered as follows: Just Right: 193; Too Fast: 21; Too Slow: 6; Not Sure: 3; No Answer: 6.

5) How was the level of difficulty in the course?

The respondents answered as follows: Just Right: 184; Too Difficult: 6; Too Easy: 8; Not Sure: 11; No Answer: 20.

6) How do you rate the instructor in the following areas:

The respondents answered as follows: a) Understood Subject Matter Excellent: 179; Good: 42; Fair: 2; Not Sure: 4; No Answer: 2; b) Understood Workplace Excellent: 141; Good: 72; Fair: 7; Poor: 1; Not Sure: 3; No Answer: 5; c) Presented Clearly Excellent: 176; Good: 46; Fair: 3; Not Sure: 2; No Answer: 2; d) Encouraged Independent Study Excellent: 166; Good: 54; Fair: 5; Not Sure: 1; No Answer: 3; e) Encouraged Work in Groups Excellent: 143 Good: 64; Fair: 10; Not Sure: 4; No answer: 8; f) Encouraged Problem Solving and Decision Making Excellent: 157; Good: 58; Fair: 4; Poor: 1; Not Sure: 4; No Answer: 5; g) Varied Learning Activities Excellent 156; Good: 59; Fair: 6; Poor: 2; Not Sure: 1; No Answer: 5.

7) What do you feel you have learned in this course?

The respondents answered as follows: 128, or 56%, said that they learned one or more math and/or reading and writing skill areas such as vocabulary, sentence structure, fractions, and percents.

8) Will you be able to use what you learned in this course on the job?

The respondents answered as follows: Yes: 201; No: 2; Not Sure: 9; Not Applicable: 7; No Response: 10.

9) Overall, how valuable was the course to you?

The respondents answered as follows: Very Valuable: 127; Valuable: 89; Not Valuable: 0; Not Sure: 4; No Response: 9.

78 respondents, or 34%, recognized the instructor as the most valuable part of the course followed by one or more reading, writing, and math skill areas, 62 respondents, or 27%; everything, 25 respondents, or 11%; and increasing one's self-confidence, 11 respondents, or 5%. 41 respondents, or 18%, found nothing to be least valuable followed by basic addition, subtraction, multiplication, and division, 16 respondents, or 7%; and class too short in duration, 11 respondents, or 5%.

10) What other courses would you like to attend?

The respondents answered as follows: 85 respondents, or 37%, would like to enroll in reading, writing, and/or math courses followed by any courses, 48 respondents, or 21%; blueprint reading courses, 25 respondents, or 11%; computer courses, 21 respondents, or 9%; and Pratt and Whitney Aircraft Learning Center (TALONS), 10 respondents, or 4.5%.

11) Do you have any additional comments?

The respondents answered as follows: 73 respondents, or 32%, classified their instructor as either excellent or good.

ESL Participants

B&B Associates: 2 ESL participants completed the course. 2 participants submitted course evaluations.

Pratt and Whitney Aircraft, Southington Branch: 36 ESL participants completed the course. 36 participants submitted course evaluations.

J.T. Slocomb Company: 30 ESL participants completed the course. 27 participants submitted course evaluations.

Total Number of submitted ESL Workplace Skills Course Evaluations: 65

Findings

1) How did you find out about the course?

The respondents answered as follows: Supervisor/Manager: 48; Human Resource Department: 9; Company Newsletter: 4; Other: 2; No Answer: 2.

2) Did the instructor state the learning objectives at the beginning of the course?

The respondents answered as follows: Yes: 39; No: 21; Not Sure: 5.

3) Did the course help you on the job?

The respondents answered as follows: Yes: 60; No: 2; No Answer: 3.

4) Was the course Too Fast: 3; Just Right: 51; Too Slow: 5; Not Sure: 3; No Answer: 3.

5) Was the course Too Difficult: 2; Just Right: 50; Too Easy: 7; Not Sure: 3; No Answer: 3.

6) How do you rate the instructor?

The respondents answered as follows: Excellent: 53; Good: 12.

7) In this course, I have learned to: 31 respondents, or 47%, recognized that they can speak, read, and write English better as a result of the course.

8) In this course, I liked: 34 respondents, or 52%, listed a variety of answers but the majority of the answers fall into the categories of everything, instructor, homework, and grammar.

9) In this course, I did not like: 8 respondents, or 13%, did not like the lack of privacy in the classroom.

10) Do you have any additional comments?

29 respondents, or 45%, want to enroll in additional ESL classes.

Reading, Math, and ESL Participant Comments The Workplace Skills Course Evaluation provided an opportunity for the participants to comment on their experience. The following are representative participant comments.

"I think this course was very good course and I learned a lot of things I have forgoting and the review was a valuable lession learned."

"I enjoyed my instructor he made sure we understand before he went on to another place."

"...the instructor made this course easier for me from the very beginning simply by saying no question was a dumb one unimportant question. Therefore, I wasn't afraid to ask questions, which he answered to the fullest until I understood how or why we would come to the correct answer."

"I really feel management and MCC should consider a lot more approach to courses offered to employees to help them in their jobs to the company."

"I like the way each person can work at their own speed."

"The course have been very exciting I learn how to write my own checks out correctly and balance my check book I all so learn how to apply the rules for expointment fractions and addition and subtraction..."

"The instructor was able to switch gears when...trying to work with students on very different levels."

"Offering courses on co. time is mush easier because people today wish to advance themselves but cant because of family resp. watching children ect. thank you very much."

"yes, I think they should keep having these course to help people who forgot what they learned in school. Good course to have for the worker...Keep up the good work."

"I used to give my daughter my checkbook to balance and now I will balance it myself."

"I will call and order my own concrete instead of having someone else come out to measure."

"It has given me an opportunity to communicate with other people and to increase my thinking ability. The more I learn the more easier my work becomes..."

Overall, the participants were overwhelmingly positive about their READS experience. The majority of the participants learned about READS from their immediate supervisor or manager; agreed that the course objectives and content related to their needs on the job; thought that the pace and level of difficulty in the course was just right; recognized the instructor as the most valuable part of the course; enjoyed opportunities for individual and group activities and problem solving and decision making that focused on real life application, teambuilding, and basic skill refresher; and, asked for further skill development opportunities at both the basic and advanced levels.

Measurement Tool

Test of Adult Basic Education (TABE)/Basic English Skills Test (BEST) Pre- and Posttest Score Comparison

Purpose

To record the participants' reading, math, and ESL skill proficiency levels as measured on a norm-referenced test prior to and after course completion.

Process

READS used the TABE and BEST to determine tne participants' reading/math and ESL skill proficiency levels respectively. These tests provide a comparison of each participant's test results with those of a normative group. Originally, READS' staff used the Educational Testing Service (ETS) Accuplacer to ensure homogeneous groupings of participants. After several classes, READS' staff found that the participants in homogeneous groups demonstrated a range of reading and math skill proficiency levels. READS' staff also found that the TABE Locator was not useful in grouping participants according to their identified TABE levels as many participants achieved the highest possible score on their assigned TABE pretest.

According to READS' Director, "In early cycles, entire classes took the same level pre- and posttest. Consequently, for those who got maximum scores on the pretest, there was no way to show quantifiable progress. In later cycles, a total of 103 participants took higher level TABE tests. Some students who took "M" pretests took "D" or "A" postests and scored at the same grade equivalent on both. For reporting purposes, again, these individuals made no progress. However, this contradicts individual learning objective evaluations and instructors' narratives detailing observations of participants..."

The TABE and BEST measures general language and math skill proficiency but not within the participants' workplace context. READS staff reported incomplete test data for 24 participants due to circumstances such as employee emergencies, illness, layoffs, shift changes, and an auto accident involving an instructor.

TABE Findings

Pratt and Whitney Aircraft: 121 out of 205 reading and math participants, or 59%, scored greater than one grade level on the post test than the pre test; 38 out of 205 reading and math participants, or 18.5%, scored less than one grade level higher on the post test than the pre test.

J.T. Slocomb Company: 20 out of 32 reading and math participants, or 62.5%, scored greater than one grade level on the posttest than the pretest; 6 out of 32 reading and math participants, or 19%, scored less than one grade level higher on the posttest than the pretest.

B&B Associates: 2 out of 7 math participants, or 28.5%, scored greater than one grade level on the posttest than the pretest; 5 out of 7 math participants, or 71%, scored less than one grade level higher on the posttest than the pretest.

Lydall, Inc.: 4 out of 13 reading and math participants, or 31%, scored greater than one grade level on the postest than the pretest; 3 out of 13 reading and math participants, or 23%, scored less than one grade level higher on the posttest than the pretest.

BEST Findings

Pratt and Whitney Aircraft: 21 out of 36 ESL participants, or 58%, scored greater than one grade level on the posttest than the pretest.

J.T. Slocomb Company: 20 out of 28 participants, or 71%, scored greater than one grade level on the posttest than the pretest.

B&B Associates: 2 out of 2 participants, or 100%, scored greater than one grade level on the posttest than the pretest.

Partner Company Combined Total: 242 out of 323 participants who submitted a TABE or BEST posttest, or 75%, scored higher on the posttest than the pretest. 190 out of the 323 participants, or 59%, scored greater than one grade level on the posttest than the pretest.

Measurement Tool

Learning Objectives Evaluation

Purpose

To record the reading, math, and ESL participants' ability to perform job-specific competencies.

Process

Beginning with J.T. Slocomb Company's Cycle 2 ESL classes, February - April 1992, READS staff and the partner company representative implemented an evaluation based on job competencies that would more accurately measure a student's job proficiency than a norm-referenced test. As a result, READS' ESL Specialist, with information provided by the partner representative, developed a list of job performance learning objectives associated with each proficiency level of the BEST. For example:

Employee will recognize when it is appropriate to sign his/her name on applications, forms, and time sheets with accuracy.

Employee will be able to demonstrate with understanding simple oral instructions given in English related to his/her job task with accuracy.

Employee will be able to read with understanding safety posters.

Employee will demonstrate understanding and recognition of warning signs from hazardous waste information.

READS staff included the instrument in all subsequent J.T. Slocomb Company and Pratt and Whitney Aircraft ESL classes. The staff also developed and implemented job performance learning objective criteria for reading and math courses at all four partner companies. According to READS' Director and Case Manager, "...the learning objectives evaluations provided the clearest and most specific picture of participants' competencies." Because job requirements varied by company and course, the instrument's criteria changed as well. Consequently, the data are inconsistent and can only be reported by individual class. The significance of these findings is that one or more of the participants were able to demonstrate specific job-related competencies. This approach is aimed directly at effecting positive skill transfer. As an example, I have included findings that represent the learning outcomes for ESL participants only.

Findings

J.T. Slocomb Company, February-April, 1992, Cycle 2:

6 out of 7 participants scored 100% on 3 out of 18 criterion items
5 out of 7 participants scored 100% on 1 out of 18 criterion items
4 out of 7 participants scored 100% on 7 out of 18 criterion items
3 out of 7 participants scored 100% on 4 out of 18 criterion items
2 out of 7 participants scored 100% on 3 out of 18 criterion items
4 out of 7 participants scored 75% on 6 out of 18 criterion items
3 out of 7 participants scored 75% on 5 out of 18 criterion items
2 out of 7 participants scored 75% on 2 out of 18 criterion items
1 out of 7 participants scored 75% on 3 out of 18 criterion items
1 out of 7 participants scored 50% on 4 out of 18 criterion items
1 out of 7 participants scored less than 50% on 1 out of 18 items

4 out of 7 participants scored 100% on 1 out of 11 criterion items
3 out of 7 participants scored 100% on 3 out of 11 criterion items
2 out of 7 participants scored 100% On 7 out of 11 criterion items
5 out of 7 participants scored 75% on 4 out of 11 criterion items
4 out of 7 participants scored 75% on 5 out of 11 criterion items
3 out of 7 participants scored 75% on 2 out of 11 criterion items
2 out of 7 participants scored 50% on 1 out of 11 criterion items
1 out of 7 participants scored 50% on 2 out of 11 criterion items
0 of the 7 participants scored less than 50% on any of the 11 items

8 out of 9 participants scored 100% on 1 out of 16 criterion items
7 out of 9 participants scored 100% on 3 out of 16 criterion items
6 out of 9 participants scored 100% on 1 out of 16 criterion items
5 out of 9 participants scored 100% on 5 out of 16 criterion items
7 out of 9 participants scored 75% on 5 out of 16 criterion items
2 out of 9 participants scored 75% on 6 out of 16 criterion items
1 out of 9 participants scored 75% on 4 out of 16 criterion items
1 out of 9 participants scored 50% on 10 out of 16 criterion items
1 out of 9 participants scored less than 50% on 3 out of 16 items

J.T. Slocomb Company, May-August, 1992, Cycle 3:

2 out of 3 participants scored 100% on 2 out of 17 criterion items
1 out of 3 participants scored 100% on 7 out of 17 criterion items
3 out of 3 participants scored 75% on 7 out of 17 criterion items
2 out of 3 participants scored 75% on 5 out of 17 criterion items
1 out of 3 participants scored 75% on 5 out of 17 criterion items
1 out of 3 participants scored 50% on 4 out of 17 criterion items
0 of the participants scored less than 50% on any of the 17 items

5 out of 6 participants scored 80-100% on 5 out of 11 criterion items
4 out of 6 participants scored 80-100% on 2 out of 11 criterion items
3 out of 6 participants scored 80-100% on 3 out of 11 criterion items
1 out of 6 participants scored 80-100% on 1 out of 11 criterion items
3 out of 6 participants scored 75% on 2 out of 11 criterion items
2 out of 6 participants scored 75% on 4 out of 11 criterion items
1 out of 6 participants scored 75% on 4 out of 11 criterion items
3 out of 6 participants scored 50% on 1 out of 11 criterion items
1 out of 6 participants scored 50% on 2 out of 11 criterion items
0 of the 6 participants scored less than 50% on any of the 11 items

Pratt and Whitney Aircraft, Southington Branch, July-October, 1992, Cycle 1:

4 out of 7 participants scored 100% on 1 out of 10 criterion items
3 out of 7 participants scored 100% on 3 out of 10 criterion items
2 out of 7 participants scored 100% on 2 out of 10 criterion items
1 out of 7 participants scored 100% on 1 out of 10 criterion items
4 out of 7 participants scored 75% on 2 out of 10 criterion items
3 out of 7 participants scored 75% on 3 out of 10 criterion items
2 out of 7 participants scored 75% on 3 out of 10 criterion items
1 out of 7 participants scored 75% on 1 out of 10 criterion items
3 out of 7 participants scored 50% on 3 out of 10 criterion items
2 out of 7 participants scored 50% on 5 out of 10 criterion items
1 out of 7 participants scored 50% on 2 out of 10 criterion items
3 out of 7 participants scored less than 50% on 1 out of 10 items
1 out of 7 participants scored less than 50% on 3 out of 10 items

6 out of 7 participants scored 100% on 1 out of 8 criterion items
5 out of 7 participants scored 100% on 2 out of 8 criterion items
2 out of 7 participants scored 100% on 1 out of 8 criterion items
1 out of 7 participants scored 100% on 3 out of 8 criterion items
6 out of 7 participants scored 75% on 1 out of 8 criterion items
5 out of 7 participants scored 75% on 3 out of 8 criterion items
3 out of 7 participants scored 75% on 1 out of 8 criterion items
1 out of 7 participants scored 75% on 3 out of 8 criterion items
1 out of 7 participants scored 50% on 6 out of 8 criterion items
1 out of 7 participants scored less than 50% on 2 out of 8 items

9 out of 9 participants scored 100% on 8 out of 8 criterion items
7 out of 9 participants scored 100% on 1 out of 8 criterion items
3 out of 9 participants scored 100% on 1 out of 8 criterion items
2 out of 9 participants scored 100% on 1 out of 8 criterion items
1 out of 9 participants scored 100% on 1 out of 8 criterion items
6 out of 9 participants scored 75% on 1 out of 8 criterion items
5 out of 9 participants scored 75% on 1 out of 8 criterion items
3 out of 9 participants scored 75% on 2 out of 8 criterion items
2 out of 9 participants scored 75% on 3 out of 8 criterion items
7 out of 9 participants scored 50% on 1 out of 8 criterion items
6 out of 9 participants scored 50% on 1 out of 8 criterion items
5 out out of 9 participants scored 50% on 1 out of 8 criterion items
3 out of 9 participants scored 50% on 1 out of 8 criterion items
2 out of 9 participants scored 50% on 2 out of 8 criterion items
1 out of 9 participants scored less than 50% on 2 out of 8 items

13 out of 13 participants scored 85%-100% on 2 out of 11 criterion items
7 out of 13 participants scored 85%-100% on 1 out of 11 criterion items
5 out of 13 participants scored 85%-100% on 4 out of 11 criterion items
13 out of 13 participants scored 74%-84% on 1 out of 11 criterion items
8 out of 13 participants scored 70%-84% on 3 out of 11 criterion items
6 out of 13 participants scored 70%-84% on 1 out of 11 criterion items
5 out of 13 participants scored 70%-84% on 4 out of 11 criterion items
8 out of 13 participants scored 50%-69% on 3 out of 11 criterion items
3 out of 13 participants scored 50%-69% on 1 out of 11 criterion items
0 of the 13 participants scored less than 50% on the 11 criterion items

Measurement Tool

Instructor Observation of Participants

Purpose

To record READS instructors' perceptions about the participants' attitude and learning progress.

Process

After the completion of each reading, math, and ESL course, the instructors submitted a written observation of each participant's attitude and learning progress.

Findings

Overall, the instructors found the participants to be highly motivated, hard working, enthusiastic, cooperative, attentive, and proud. Most of the participants enjoyed the opportunity to participate in READS courses. The majority of the participants achieved significant gains as evident from the results of their classroom work; they seemed to welcome job-related content, basic skill review, and individualized and small group exercises.

In some instances, the participants came to class unprepared as a result of job demands or personal problems. In other instances, the participants voiced their concern about losing their jobs as a result of difficult economic times. Some of the instructors commented that this concern may have impeded the learning process. According to READS' Director, at one partner company, "...the fear and stress caused by impending layoffs began to affect participants' attitudes and had a negative impact on the atmosphere in the classroom."

One partner company mainstreamed workers for whom English is a second language into reading and math courses. Two reading and math instructors at the partner company mentioned that these participants should not be mainstreamed into reading and math courses. The instructors agreed that these participants would better develop their language skills in an ESL course.

The most prevalent observation, however, was the participants' desire for personal and professional development. In particular, many participants seemed interested in courses such as advanced reading and writing, algebra, trignometry, blueprint reading, and computers.

One consistent theme was the participants' lack of self-confidence as learners. The following are representative instructor comments that illustrate the theme:

"I found that some started out with very little confidence in themselves. They also had some hidden fears about their ability to learn. They were all a little anxious about what to expect."

"As often as cooperative learning exercises were used, there seemed to be some hesitation or lack of confidence in each self to contribute and completely participate."

"They were frequently encouraged to believe in themselves and their own ability..."

Another consistent theme was the the participants' diversity in terms of job responsibilities and skill levels. Overall, the range of diversity made it difficult for the instructors to modify the course according to the participants' individual learning needs. The following are representative instructor comments that illustrate the theme:

"Jobs ranged from mill worker to carpenter shop boss. Abilities were also diverse. Two did only whole nos., one finished whole nos. and fractions, one did whole nos., fractions, decimals, ratios and proportions, and percents, and another almost the same..."

"The participants had various skill levels. Some were highly skilled, others average or just below average, and four were ESL students...They held...jobs such as machine operators, heat-treat operators, and welders."

"Skill levels also varied in that a few students were able to speak, write, read, and listen well, while others had weaknesses in some or all of these areas. One student was a supervisor and another student worked with micrometers. The students worked on assorted machines, forming materials into the different parts needed to build stators and micrometers."

"The participants' original skill levels varied from a 7th grade through 12th grade level according to the TABE results....All participants were factory laborers: several machinists, two bench mechanics, inventory clerk, welder...material processor, plumber, and a worker in shipping and receiving."

"The group unfortunately was too diverse for maximum successful achievement. Grade levels ranged from grade 1 to grade 12.9 and making it necessary to break into groups and resulting in a decrease in effectiveness. Not only were the participants worlds apart in ability, tney also differed greatly in language and cultural backgrounds."

The instructors reported that of the 347 participants who completed READS, 256, or 74%, are ready for the next instructional level; 57, or 16%, should remain at their current instructional level; 20, 6%, should enroll in an ESL course; and, 14, or 4%, can enroll in Pratt and Whitney Aircraft's computer-assisted learning center.

Measurement Tool

Instructor Feedback

Purpose

To record READS instructors perceptions about the factors that contribute to a successful or unsuccessful workplace literacy course.

Process

After course completion, READS instructors determined if the experience was successful or unsuccessful and supported their responses in writing.

Findings

All of the instructors found the READS experience successful mainly because of the participants' enthusiasm about the courses, their motivation to learn, and their learning progress. The instructors identified the administrative and communication support provided by READS' staff as the primary reason for the success of the operation. The majority of the instructors asked for ways to reduce distractions and/or interruptions in the classroom; ensure privacy, space, and materials in the classroom; determine the participants' skill levels for placement purposes; keep job demands, heavy workload, and cutbacks from interfering with class attendence and participation; increase supervisory support; control last minute course modifications; and, extend course duration to accomplish objectives.

I have grouped representative instructor comments about READS' operation below.

Classroom Facilities:

"The courses require a permanent, private classroom."

"The classroom was too small for such a large class."

"From discussions with students, although they never complained while we were there, it was clear that our 'classroom' was not entirely appropriate. Having neither a private nor a clean working space...there was a lot of noise and a lot of distractions."

"...needed a better place to locate class. We were all over. We started in a nice conference, but couldn't remain."

"...it would be helpful to remain in one area and be able to keep materials there and have a copier, pencil sharpener, pencils, etc."

"Better materials, i.e., blackboard, markers supplied by employer."

"There was a lack of materials, (e.g., dictionary, chalk, markers, booklets)."

"The supply of materials was another weak area but it's expected when many use one classroom. I carried my own chalk and dry erase markers."

"Most factors including blackboard, markers, and classroom facilities have been improved."Selection and Grouping:

"Minimize the disparity between educational background and learning ability of class members."

"A crying need for better selection and grouping of students and identifying their strengths and weaknesses and a more effective testing program."

READS' Staff Support:

"READS' staff provides good followup and excellent support."

"Administration was extremely helpful at all times."

"Good followup from administration on all aspects of the program."

"Everything went extremely well during the course. Supervisors, college administrators and class schedules were all excellent."

"I see improvement all the time. Communication has much improved."

"The schedule, location, and time were excellent."

"The READS...end of it is absolutely excellent. The personnel and services and communication are tops."

Course Design:

"There needs to be more course time."

"...two or three more weeks should be scheduled for the work."

"The course objectives had to be applied to the course syllabus and changed a bit."

"I originally expected to teach only those areas listed in the course syllabus. Percents were added and then more topics to prepare for the TABE were added."

Company Support:

"The economic situation (downgrading) was the destructive factor on the students development in ESL."

"Administration of the course can be improved by letting the supervisors know that this is not fun and games. They should be more willing to allow the workers the time they need for class."

"The supervisors have to try to make this course more of a priority as do some students. At times I don't think it's taken seriously enough and is pre-empted for too many reasons."

"Absences due to shift changes or job training. One student had somewhat frequent absences due to personal items...Some students did homework but regularly. Some came without materials..."

Measurement Tool

Instructor's Self-Evaluation

Purpose

To record READS' instructors perceptions about their ability to teach a workplace literacy course.

Process

READS employed a total of 17 instructors. When an instructor completed more than one self-evaluation as a result of teaching multiple classes, I averaged their ratings. Two of the 17 instructors did not complete a self-evaluation because I introduced the form prior to Pratt and Whitney Aircraft's Cycle 2; the two instructors taught only in Cycle 1. The number that follows each self-evaluation item represent the number of instructor responses for that item.

Findings

Knowledge of the course's subject matter: Strength: 15; Satisfactory: 0; Needs Improvement: 0.

Knowledge of the workplace: Strength: 4; Satisfactory: 8; Needs Improvement: 3.

Knowledge of competency-based approaches to learning: Strength: 9; Satisfactory: 5; Needs Improvement: 1.

Ability to establish a climate of mutual trust and support: Strength: 15; Satisfactory: 0; Needs Improvement: 0.

Ability to create a highly participative learning environment: Strength: 13; Satisfactory: 1; Needs Improvement: 1.

Ability to relate the course to the participant's actual job tasks/situations: Strength: 8; Satisfactory: 6; Needs Improvement: 1.

Ability to relate the course to the participant's individual learning needs: Strength: 11; Satisfactory: 3; Needs Improvement: 1.

Ability to encourage an appreciation for lifelong learning: Strength: 11; Satisfactory: 4; Needs Improvement: 0.

Ability to develop self-direction for the workplace: Strength: 7: Satisfactory: 7; Needs Improvement: 1.

Ability to develop problem solving and decision making for the workplace: Strength: 5; Satisfactory: 9; Needs Improvement: 1.

Ability to develop teambuiiding for the workplace: Strength: 6; Satisfactory: 8; Needs Improvement: 1.

Ability to provide feedback to the participants about their learning progress: Strength:11; Satisfactory: 4; Needs Improvement: 0.

Ability to use different types of learning activities: Strength: 10; Satisfactory: 4; Needs Improvement: 1.

Overall, the instructors demonstrated expertise in their subject matter area, established a highly participative classroom environment built on mutual trust and support, related course content to the participants' individual needs, provided constructive feedback, and encouraged an appreciation for lifelong learning. Their development needs fall mainly into the category of training and development methods for the workplace, (e.g., the knowledge of the marketplace, business mission and plan, and organizational levels; the knowledge of job-specific competency-based approaches to learning; the ability to relate the course content to the participant's actual job tasks and situations; the ability to develop self-direction, teambuilding, problem solving, and decision making specifically for the workplace).

Measurement Tool

Evaluator's Site Visits/ Course Design Review

Purpose

To record whether or not the curriculum model, instructional activities and materials, and teaching methods are sufficient to accomplish READS' goals.

Process

I conducted 19 evaluator site visits and reviewed READS' original and existing curriculum model and textbooks. I visited classrooms in buildings located on the property of the partner companies. Originally, READS' staff used the basic skill curriculum model developed by Manchester Community College and Pratt and Whitney Aircraft to prepare front line workers for Pratt and Whitney's apprenticeship program. READS used a combination of academic and workplace-based textbooks to deliver the objectives described in the curriculum model. Ultimately, READS developed its own curriculum model based on the participants' job requirements and workplace materials provided by the partner companies.

Findings

1) Do the learning objectives encompass the conditions, actions, and standards required by the participant for successful job performance? Yes: 5; No: 14.

In the majority of site visits, I observed that the learning objectives did not encompass the conditions, actions, and standards required by the participant for successful job performance. However, the site visits in which I observed job performance learning objectives occurred in the latter part of the program as part of the workplace model.

In the academic model, the objectives were generic. For example,

To write a standard numeral in expanded form

To subtract one whole number from another using regrouping

Identify the stated main idea in a brief article

Utilize alphabetical order to locate unknown words in the dictionary

In the workplace model, the learning objectives were job-related and tied to the participants' specific job performance expectations. For example,

Using passages drawn from company materials such as MOSs, POPs, MSDSs, memos, newsletters, and from general texts, the employee will be able to interpret a text by identifying cause and effect, use skimming or scanning to determine if a text contains relevant information, and coordinate information from two or more texts.

The employee will be able to recognize job-related vocabulary, interpret job-related vocabulary, and identify job-related abbreviations and symbols.

The employee will be able to locate chart information at the intersection of rows or columns.

The employee will be able to demonstrate the ability to use measurement tools to measure parts against the company Operation Process Sheet with accuracy.

The employee will be able to demonstrate understanding and recognition of warning signs from hazardous waste information with accuracy.

The employee will be able to demonstrate through use of calipers the understanding of whole numbers and decimals to the 5th place.

The above learning objectives promoted the development and application of language and math skills at the same time. This approach seemed to satisfy the individual learning needs of the participants and the organizational needs of the partner company.

The learning objectives in the textbooks that supported the academic curriculum model did not encompass the conditions, actions, and standards required by the participants for successful job performance. The learning objectives in four of the textbooks that supported the workplace curriculum model, Mastering Reading: Manufacturing Series Books 1,2,3, and 4, focused on the application of basic skills within a workplace context; however, the textbooks presented reading and math skills and their application across the manufacturing industry and were not specifically aimed at the participants' job requirements. The learning objectives in two textbooks that supported the workplace curriculum model, Reading and Critical Thinking Books 1 and 2, were popular with the participants; however, the textbooks presented reading comprehension and thinking skills and their application outside of the participants' job responsibilities.

2) Are the learning objectives specifically stated? Yes: 19.

The academic curriculum model and its textbooks and the READS' workplace curriculum model and its textbooks provided a clear, comprehensive list of learning objectives.

3) Do the content, learning activities, and instructional materials evolve from specific job tasks and situations? Yes: 5; No: 14.

If yes, do they support the learning objectives? Yes: 5; No: 0.

If yes, are they of value to the participant? Yes: 5; No: 0.

If yes, are they of value to the participant immediate supervisor/manager? Yes: 5; No: 0.

The content, learning activities, and instructional materials in the academic curriculum model and its texbooks do not evolve from specific job tasks and situations. The content, learning activities, and instructional materials in READS' workplace model do evolve from specific job tasks and situations.

4) Do the participants demonstrate motivation for learning? Yes: 19.

In all site visits, I observed the participants asking and answering questions; actively listening and challenging the instructor; drawing from their prior knowledge and experience, and relating learning objectives, content, and activities to their personal and professional learning needs.

5) Is there a climate of support and mutual trust between the participants and the instructor? Yes: 19.

In all site visits, I observed the instructors coaching and counseling the participants regarding their individualized learning needs and potential learning barriers; respecting the participants' knowledge base and experience; displaying enthusiasm and energy and flexibility in delivery; offering timely and constructive feedback about learning progress to the participants. Each instructor treated the building of the participants' self-esteem as a priority.

6) Is the pace of instruction appropriate? Yes: 19.

In all site visits, I observed enough time for the participants to adequately complete the learning activities, to identify strengths and development needs, to practice skill areas in need of improvement, and to demonstrate evidence of competency.

7) Does the level, sequence, transition of content, learning activities, and instructional materials facilitate learning? Yes: 19.

The level, sequence, transition of content, learning activities, and instructional materials in both models facilitated learning. However, the workplace model, if followed closely, facilitates learning that best satisfies both participant learning needs and partner company organizational needs. Between the middle and the end of 1992, READS staff implemented and monitored the use of the workplace model in reading/math and ESL courses at J.T. Slocomb Company, B&B Associates, and Lydall, Inc. The instructors at these sites toured floor operations, developed instructional materials from generic workplace situations and materials, (e.g., employee benefit policy booklet, company newsletter, employee handbook), provided by the partner company representative and specific job tasks provided by the participants. At J.T. Slocomb Company, for example, the two ESL instructors reported that by course completion the participants could read and write basic memos, fill out forms, comprehend and follow basic operation sheets, and use general and work-related vocabulary. At Lydall, Inc., the reading participants opted to use instructional materials that varied from personal to professional contexts.

Of all the site visits, however, I observed the successful implementation of the workplace model during ESL courses at Pratt and Whitney Aircraft's Southington site between July and October, 1992.

My observations indicate that these ESL courses exceeded all previous expectations. Throughout the courses' duration, READS staff, the community college staff at both Manchester Community College and Tunxis Community College, and the supervisory and training staff and employees established and maintained excellent communication and cooperation. The supervisors provided actual workplace situations and materials as context for learning and even took turns participating in class. The instructors relied on the employees' knowledge and experience as the starting point for learning, toured floor operations, observed the employees performing actual tasks, and converted workplace situations and materials into a variety of learning activities. READS' ESL Specialist developed a list of instructional strategies for reinforcing ESL instruction, (e.g., repeat important instructions, show how to do a task while you explain it, explain the whys of important procedures). The educational

providers facilitated periodic meetings to present status reports, identify and address problems, and plan for future course offerings. The participants provided and obtained ongoing feedback about their learning progress, job performance expectations, and the ability to use newly acquired skills on the job.

During one course, two supervisors participated in a learning activity that encouraged employees to match technical terms and acronyms to job-related illustrations. Their involvement steered the participants into a discussion about the reason for certain job tasks in a particular sequence. From the discussion, the instructor focused on developing the participants' vocabulary, pronunciation, and word construction skills. The Health and Safety Officer, a guest speaker during another course, encouraged the participants to ask questions about and discuss hazard communication, emergency numbers, material safety data sheets, and labels. From this activity, the instructor identified the participants' language skill strengths and development needs and planned appropriate learning strategies. All of the participants in another course received a Pratt and Whitney Quality Plus Glossary, a reference that lists technical terms and acronyms used to ensure quality products and processes. During a mid-cycle meeting, six Pratt and Whitney Aircraft supervisors and training representative, educational providers, and instructors identified specific work situations in which some employees demonstrate language skill deficiencies. For example, when switching jobs, many employees do not ask their supervisor how to perform the new job and experience difficulty before they even begin. The discussion led all in attendence to identify ways to use ESL training to improve overall operations. During other meetings, the attendees discussed the development of ESL skills to operate new machines, to participate in the Suggestion Program, and to maintain safety standards.

8) Are the learning activities varied and stimulating? Yes: 7; No: 12.

In the majority of site visits, I observed a reliance on the same one or two types of learning activities, (e.g., individualized instruction, small group exercises, lecture/discussion). Although the learning activities that I observed were stimulating, there should be an appropriate balance to hold participant interest and address different learning styles. Instructors at the other sites experimented with a variety of learning activities.

9) Are indicators built in to the learning activities which serve as a vehicle for determining evidence of the participants' competency? Yes: 19.

The learning activity indicators in both models serve as a vehicle for determining evidence of the participants' competency.

10) Is the classroom conducive to learning? Yes: 11; No: 8.

In the majority of the site visits, I observed classrooms that permitted movement, accessibility, and privacy. The lack of movement, accessibility, and privacy in the others seemed to impede the learning process and send a message to the participants and the instructors that the course was not considered important by the partner company.

11) Does the instructor demonstrate competency for teaching a workplace basic skills development course? Yes: 19; No: 0.

All of the instructors demonstrated the ability to establish a classroom conducive to learning and achieve READS' goals. Overall, I found the instructors to be professional, dedicated, sensitive, adaptable, and energetic. According to READS Director, "...the majority of the 17 instructors involved in the READS Program responded readily to suggested strategies for teaching in the workplace. They were flexible, creative, and resourceful. Without exception, all of the instructors established excellent rapport with participants, allaying fears, helping to build self-confidence, and establishing relationships based on trust."

Throughout the program, READS staff maintained close contact with the instructors to provide ongoing coaching support through telephone conversations and informal meetings. Midway through the program, READS Director arranged a 3 hour in-service workshop for the instructors as a first step toward professional development for teaching in the workplace. Nine instructors attended the workshop. The workshop covered the instructional components that contribute to successful workplace literacy programs including a knowledge of client company expectations and job performance objectives. The workshop also provided opportunities for the instructors to share their experiences in READS and create an action plan for ongoing professional development.

Almost all of the instructors initiated activities to develop their knowledge and skills for teaching in the workplace. Some instructors broke away from their predominant teaching method, (e.g., lecture and discussion, small group, individualized) and used a variety of learning activities to address different learning styles and hold the attention of the participants; researched current workplace issues and trends; worked with the participants to determine the knowledge, skills, and attitudes associated with the participants' job tasks; translated job requirements into specific, results-oriented, and measurable job performance objectives; developed and presented content within the participants' workplace context; and, converted workplace materials into instructional materials.

As the program progressed, READS staff and I noticed an improvement in all of the instructors to teach in the workplace.

Measurement Tool

Participant Pre-Evaluation

Purpose

To record the participants' perceptions about the reading, math, and ESL skills needed prior to enrollment in a READS course.

Process

READS instructors distributed and collected the pre-evaluation on the first day of class. The instructors used the results of the pre-evaluations to prioritize the participants' individual learning needs during class.

Findings

Math Skills: 187 out of 213 participants, or 88%, submitted the math pre-evaluation. The respondents reported the following skill areas in need of development:

# Participants	Skill Areas in Need of Development
120	add, subtract, multiply, divide whole numbers, decimals, fractions, and/or percents
112	calculate ratios and proportions
96	calculate measurements, (e.g., volume, distance, temperature, weight, time)
92	interpret measurement scales
14	algebra

The respondents reported the following additional skill areas in need of development: problem solving, 76; writing memos, 54; decision making, 24; working in teams, 24; presenting oral reports, 21.

Reading Skills: 105 out of 159 participants enrolled in reading courses, or 66%, submitted the pre-evaluation. The respondents reported the following skill areas in need of development:

# Participants	Skill Areas in Need of Development
83	understand technical terms
64	find information
51	interpret charts and drawings
48	follow instruction
8	remembering details
6	spelling

The respondents reported the following additional skill areas in need of development: writing memos, 55; presenting oral reports, 42; decision making, 37; problem solving, 36; and working in teams, 28.

ESL: 72 out of 79 participants enrolled in ESL courses, or 91%, submitted the ESL pre-evaluation. Almost all of the respondents reported that they needed to develop the following skills equally: understanding technical terms, understanding safety issues, following instructions, and understanding job tasks.

Measurement Tool

Participant Post-Evaluation

Purpose

To record the participants' perceptions about their ability to apply newly acquired skills on the job.

Process

READS staff conducted one-on-one post evaluation interviews 90 days after the participants completed a READS course. For the final cycle, the staff conducted the interviews in less time to meet the grant completion deadline. The reading and math post-evaluation forms are identical.

Findings

Reading and Math Combined: 139 out of 279 participants who completed READS courses, or 50%, submitted reading and math post-evaluations. The respondents reported the following results:

# Participants	Results
130	Feel better about themselves as a worker
101	Improved the quality of work
50	Accepted additional responsibilities
29	Improved attendence
23	Promoted
20	Pursuing a GED
9	Not changed job performance
9	Terminated
5	Transferred to another department

ESL: 52 out of 68 participants who completed ESL courses, or 76%, submitted the post-evaluation. The majority of the respondents, 46, or 88%, indicated that they developed almost all of the skills listed on the post-evaluation, i.e., filling out forms, understanding written information, understanding words used on the job, understanding what others say, finding information, signing name, using the time clock, spelling, setting up machines, using measurement tools, understanding Material Safety Data Sheets (MSDS), setting goals.

Measurement Tool

Supervisory Pre-Evaluation

Purpose

To record the supervisors' perceptions about the participants' reading, math, and ESL skill needs prior to enrollment in a READS course.

Process

READS staff distributed the supervisory post-evaluation prior to the first day of a READS course. The results supplemented the results of the participants' pre-evaluation.

Findings

Math: READS staff received 35 supervisory math pre-evaluations. The respondents reported the following math skill areas in need of development:

# Supervisors	Skill Areas in Need of Development
22	add, subtract, multiply, divide whole numbers, decimals, fractions, and/or percents
19	calculate ratios and proportions
11	calculate measurements, (e.g., volume, distance, temperature, weight, time)
8	interpret measurement scales

The respondents reported the following additional skill areas in need of development: problem solving, 13; decision making, 12; working in teams, 9; and, verbal and written communication, 9.

Reading: READS' staff received 27 supervisory reading pre-evaluations. The respondents reported the following skill areas in need of development

# Supervisors	Skill Areas in Need of Development
16	understand technical terms
11	interpret charts and drawings
10	follow instructions
8	find information
1	spelling

The respondents reported the following additional skill areas in need of development: problem solving, 14; working in teams, 14; decision making, 6; verbal communication, 4; writing memos, 2.

ESL: READS staff received 32 supervisory ESL pre-evaluations. The respondents reported the following skill areas in need of development:

# Supervisors	Skill Areas in Need of Development
25	understanding what others say
20	understanding written information
20	understanding words used on the job
17	filling out forms
8	finding information
7	understanding Material Safety Data Sheets (MSDS)
5	spelling
4	using measurement tools
3	setting up machines
3	setting goals
2	using the time clock
2	signing name

Measurement Tool

Supervisory Post-Evaluation

Purpose

To record the supervisors' perceptions about the participants' ability to use newly acquired skills on the job.

Process

READS staff distributed the post-evaluation to participants' supervisors 90 days after the participants completed a READS course. For the final cycle, the staff distributed the forms in less time to meet the grant completion deadline. The reading and math post-evaluation forms are identical.

Findings

Reading and Math Combined: READS staff received 27 supervisory post-evaluations. The respondents reported the following results:

# Supervisors	Results
27	Feel better about themselves
23	Improved the quality of work
13	Enrolled in another course
6	Has not changed job performance
3	Accepted additional responsibilities
3	Improved attendence
2	Promoted
0	Pursuing a GED
0	Transferred to another department
0	Terminated

ESL: READS staff received 58 supervisory post-evaluations. The respondents reported the following results:

# Supervisors	Results
34	understanding what others say
30	understanding words used on the job
24	understanding written information
22	using the time clock
20	filling out forms
19	signing name
11	finding information
8	spelling
4	using measurement tools
4	understanding Material Safety Data Sheets (MSDS)
3	setting up machines
2	setting goals

Measurement Tool

READS Final Report, Monthly Activity Monitoring Report, and Cycle Reports

Purpose

To summarize READS' objectives and accomplishments, on-site operation, strengths, problems, types and numbers of classes, final enrollment statistics, participation data, test data, data collection methods, other participant outcomes, departures from target dates, and recommendations.

Process

Each month throughout the program, READS Director and Case Manager completed an activity monitoring report. The report provided information on activities planned for the month, which ones were and were not accomplished, impact and outcomes of the accomplishments, and reasons for delayed activities. At the end of each cycle, READS Director and Case Manager completed a Cycle Report. The report provided information on beginning and ending enrollment, recommendations, for further skill development, problems and solutions, and norm-referenced test results. After January 15, 1993, READS' Director translated the data from the above reports into READS' Final Report and submitted the report to the U.S. Department of Education on April 15, 1993.

Findings

347 out of 451 participants who enrolled in READS' courses, or 77%, completed the courses. READS staff initiated a number of actions to ensure sufficient resources in terms of personnel, procedures and materials, facilities, and time. Specifically, the staff:

- hired an English as a Second Language specialist to ensure that courses were designed within a functional context;

- changed the aim and format of the final literacy audit to obtain specific, detailed job-related competencies; the audit relied on multiple sources of data including direct observation of workers performing job tasks, structured and unstructured interviews with workers and supervisors, employee questionnaires, documentation review of job descriptions, quality control and training manuals, and assorted production forms;

- worked closely with partner company representatives to elicit supervisory and senior management support at four out of five sites, (e.g., resistance to the program, lack of broad company ownership, encouragement and cooperation, lack of organizational support systems for, input into, and understanding about READS' goals);

- selected outstanding instructors who established an environment conducive to learning and were willing to develop and practice instructional strategies related to the workplace;

- continually observed the instructors and made specific suggestions for teaching in the workplace;

- facilitated an in-service workshop for instructors on teaching methods for the workplace;

- facilitated a workshop for partner company representatives and middle and senior management called Issues in Workplace Education to discuss actual issues, (e.g., cost justification, marketing and recruitment strategies, conflicts between production demands and company time course offerings), experienced by READS staff and partner companies; the workshop included a presentation from the Director of Workforce Transition at Pitney Bowes; the workshop allowed the partner company representatives to propose recommendations for resolving the issues;

- developed and implemented a workplace curriculum model to replace the academic model developed and implemented by Manchester Community College and Pratt and Whitney Aircraft for the latter's apprenticeship program;

- conducted frequent on-site meetings with the partner company representatives to ensure that their company's goals were being met; to provide advice regarding marketing and recruitment strategies; and, in some instances, to conduct meetings with management, supervisors, and employees about the READS' goals and courses;

- supplemented norm-referenced tests with competency-based assessment tools that are closely aligned with the participants' job requirements;

- received approval from the partner company representatives to use workplace situations and materials in course design;

- implemented an employee intervention process to counsel potential course dropouts;

- developed and piloted implementation of a computer simulation program, recommended by the state's Business and Industry Services Network, to complement math courses with teambuilding an dproblem solving skills;

- consistently requested classrooms, whenever necessary, to be available, permanent, and spacious;

- justified all departures from pre-established target dates to meet grant goals, (e.g., applied for and received a four month extension from the U.S. Department of Education to compensate for postponements caused by seasonal production pressures, layoffs, restructuring, medical absence of one partner company representative, absence of worker/union involvement, classroom space limitations, and recruitment difficulties).

Measurement Tool

Partnership Focus Group Discussion

Purpose

To record the READS partner company representatives' perceptions about the partnership's degree of success.

Process

Throughout the program, READS Director facilitated quarterly partner company meetings usually held at one of the partner company sites. The purpose of the meetings was to present status reports, share successes and failures, and discuss problems and solutions. At each quarterly meeting, I facilitated a discussion of the following questions:

1) Have the participants positively impacted your company's productivity as a direct result of READS' instruction, (e.g., cost savings, product quality, turnaround time)?

Two partner company representatives had difficulty answering this question because no company measures were in place to enable participants and their supervisors to evaluate productivity levels prior to and after course completion. During the final quarter, another representative reported that READS participants are working better with their supervisors, contributing excellent ideas during weekly production quality circles, asking more questions on the shop floor, and communicating to their peers and supervisors in English. Still another representative reported that 13 out of 15 participants improved the quality of their work and feel better about themselves as workers. Again, no company measures were in place to formally evaluate productivity levels prior to and after course completion. Also during the final quarter, another representative recognized 3 participants for their role in reducing waste and promoted 4 out of 9 participants.

2) Are the resources in terms of personnel, procedures, materials, facilities, and time sufficient, given current knowledge, to achieve the goals according to schedule?

All of the partner company representatives praised READS staff and instructors for their dedication and professionalism. Two representatives recognized READS staff for establishing an employee intervention process at their companies. The purpose of the intervention process was to understand the reasons for participant dropout and provide counseling support. Another representative welcomed the communication network established by READS' Director between Manchester Community College, the partner company representatives, the instructors, and the participants. The network

addressed activities and timeframes to achieve partner company and grant goals, course design modifications, general problems and issues, and the evaluation process. Three of the representatives worked closely with READS' staff to market and recruit the program. These activities included brochure development, floor meetings, supervisory meetings, and plenary sessions. Two of the representatives complimented READS staff for conducting literacy audits that resulted in a detailed breakdown of the knowledge, skills, and attitudes required to perform identified jobs.

All of the representatives agreed that supervisory support is critical to the success of the program. They also agreed that the majority of participants' supervisors need to see the relationship between course participation and job performance. These supervisors do not understand READS' goals and are under pressure to meet tight production deadlines and heavy workload. These two factors seemed to cause absence, tardiness, and a lack of class preparation.

A new representative in the final quarter of the program described the supervisory support of READS at another site of a partner company. The representative explained that these supervisors provide information about job responsibilities and company operations to READS instructors, participate in class whenever necessary, allow the participants to practice their newly acquired skills on the job, and monitor their progress. The representative continued to say that the program would have probably failed if the supervisors did not participate to the degree they did. All of the representatives agreed that their company's senior management should become actively involved in communicating the importance of READS to the supervisors and workers.

All of the representatives agreed that READS instructors related course objectives and content to the participants' personal learning needs and workplace needs. About midway through the program, the representatives recognized the importance of providing workplace situations and materials for use in the classroom. At this point, they began to see themselves and their company's staff as resources for learning.

Measurement Tool

Contributing Partner Survey

Purpose

To record READS' partner company representatives' perceptions about the components of a successful relationship among contributing partners.

Process

READS' staff distributed the survey to all four partner company representatives on January 15, 1993. READS' staff received completed surveys from two representatives at B&B Associates and the representative at J.T. Slocomb Company. The representatives from Pratt and Whitney Aircraft in both the East Hartford and Southington sites and Lydall, Inc. did not return completed surveys.

Findings

1) What have your company's goals been relative to READS? Have these goals changed throughout the program?

The repondents identified the following goals for participants: to improve reading and writing skills for the workplace and for outside, to understand work instructions more clearly, to ask for clarification, to improve selfesteem, and to prepare for career advancement. The respondents reported that their company's goals did not change throughout the program.

2) Would you call READS a success? Why or why not?

The respondents agreed that READS was a success. They defined success in terms of job performance improvement, employee promotions, increased self-esteem, and continued interest in professional development.

3) Have you noticed an improvement in READS' participant productivity? If so, provide some examples.

The respondents noticed improvement in the following forms: 3 participants recommended ways to reduce waste and 2 participants were promoted.

4) What difficulties, if any, did you encounter as you implemented READS? How did you overcome them? Do some difficulties still exist? Has company policy changed as a result of READS?

The respondents identified the following difficulties: lack of management and/or supervisory commitment for hourly worker skill development, lack of awareness from hourly workers of READS' courses, and production workload demands as a priority over course participation. All of the respondents agreed that the difficulties still exist and that company policy has not changed as a result of READS.

5) How would you describe the purpose of the partnership among the four contributing companies? Was the partnership beneficial? Why or why not? Will you continue to collaborate with the other partners after completion of READS?

The respondents agreed that the partnership's purpose was to share each company's successes, failures, problems, and solutions. They agreed that the quarterly partnership discussion enabled them to validate their company's stated goals. They also agreed to pursue an ongoing relationship with the other partner companies. Two of the respondents, from different partner companies, acknowledged READS' staff for their ongoing commitment and support.

The following are excerpts from partner representative comments:

"READS was a success. For those who participated and finished, their own goals and those of the company were met. JTS now has employees who understand written and verbal instructions better."

"Productivity evaluation is dificult because we did not have a measure of employee productivity for comparison prior to the READS Program."

"The 'partnership' of the four companies was very beneficial to each of us! The sharing of problems, resolutions, benefits, etc. enabled us all to deal with a sensitive subject matter. We have established a closer relationship with the other companies..."

"During recent performance evaluations three of the READS participants were noted for measurable waste reduction. One person has moved up two levels of craftsmanship in the pressroom."

"We could see other companies' concerns and through our meetings with the READS partners we could use the information to re-focus and get closer to our goals...significant ideas were shared so we could better plan and organize our efforts to overcome some of our problems."

"The binding force that held the program on track was the close attention from the coordinator and staff at MCC."

Comparison of Findings to READS' Goals

To compare the findings to READS' goals, I have converted each goal into a question and responded accordingly.

1) Do successful, collaborative relationships exist between East of the River Alliance (ERA) members and state, community, and volunteer agencies to provide workplace skills by an increase of 50%?

Although initial efforts are underway by partner companies, it is too early to declare the collaboratives a success. For example, three partner companies distributed to their hourly workers information compiled by READS staff about the courses available through the state's adult education programs; one partner company has asked a regional education consortium to staff computer learning centers devoted to basic skills remediation; and, one partner company is sponsoring the design, development, and delivery of advanced reading and math courses from a Connecticut Department of Labor grant.

To date, the four partner companies have met quarterly throughout the program to update and support each other and to share experiences. Now that the grant is over, there is no indication that the partner company representatives will be working as an alliance to accomplish this goal. Before the partner companies continue an alliance, however, they must first see themselves as a partnership. This requires the representatives to create a mission statement and to identify roles and responsibilities and resources for achieving the mission.

The term, successful, collaborative relationships to provide workplace skills, is vague and the assigned 50% increase is difficult to measure. The goal should have described the type of outcomes or behaviors that would be considered a success or a collaboration.

2) Is 75% of the instruction tailored to meet specific occupational needs?

This was the one area in which READS made the most gain. READS gradually moved away from a program based on an academic curriculum model and textbooks to one based on the best practices of workplace learning. By the end of the grant period, READS was on its way to tailor 100% of the instruction to meet specific occupational needs.

The main reason for the gain was the consistent effort by READS Director to find the best way to reach specific partner company goals. This effort caused the Director to initiate an informal independent study of the best practices of workplace learning, to implement a comprehensive literacy audit of selected job requirements, to hire an ESL specialist to develop competency-based learning objectives, to ensure the release of workplace situations and materials for use

in course design, to purchase workplace-based textbooks for skill practice, to facilitate an instructor development workshop on teaching methods for the workplace, to narrow course learning objectives to those that relate to each participant's needs as reported on the TABE or BEST, to ask three math instructors to evaluate a contextual computer simulation program as a complement to classroom delivery, to provide the partner company representatives with ongoing support, to encourage supervisors and managers to commit to READS, to facilitate an expanded partner company meeting to learn from the succeses of a workplace basic skill program outside of READS, and to raise middle and senior managers' awareness of READS' goals and methods.

The degree to which READS courses can be tailored to meet occupational needs is dependent upon accessibility of job-related information from the partner companies. The lack of access to supervisors and workplace information at the largest partner company, Pratt and Whitney Aircraft, East Hartford, prevented any course modifications until mid-1992. At that time, the company released their own comprehensive report on hourly job competencies to READS staff and course modifications followed. However, these modifications represented generic job competencies across Pratt and Whitney's organization, not the specific job competencies required by the company's participants. The degree to which a tailored course can be delivered is also dependent upon homogeneous class groupings and limited number of participants.

3) Do 100% of the companies involved report cost savings and quality of life for the employees?

None of the partner company representatives reported company measures that would allow a comparison between productivity levels prior to and after course completion. Generally, the representatives reported that READS participants are working better with their supervisors, contributing excellent ideas during weekly production quality circles, asking more questions on the shop floor, communicating to their peers and supervisors in English, improving the quality of their work, and feeling better about themselves as workers. One partner company recognized 3 participants for their role in reducing waste and promoted 4 out of 9 participants.

Overall, the participants stated that they considered READS very valuable, feel better about themselves as workers, have improved the quality of their work, will use what they learned on the job, and would like to enroll in more skill development programs. Their written comments reflect more self-confidence to perform new tasks both inside and outside of work. The majority of participants scored greater than one grade level higher on the norm-referenced posttest than pretest. Although none of the participants commented on the increase, it probably increased the participants' self-esteem. All of the ESL participants were able to demonstrate some job-related

competencies as the ESL Specialist specifically designed the courses' objectives for that purpose.

4) Do 100% of the manufacturers involved in ERA work together and provide for and benefit their workers and the local economy?

All of the partner company representatives considered their partnership a success because of the opportunity to meet once per quarter, update each other on company trends and milestones, share what works and what doesn't, and describe how they overcame any barriers. Over time, the representatives bonded as resources. All of the representatives stated that they understood and shared READS goals as described in the federal grant proposal. They also agreed that each partner company must interpret and re-interpret these goals according to company needs. To that end, the representatives served as liaisons between senior management and READS staff, worked closely with supervisors to gain their support, marketed and recruited for the program through company newsletters and employee meetings, scheduled classes, counseled participants, and provided workplace information for course design. Prior to READS, three of the four partner companies had not provided training for their front line production workers; two of the partner company representatives commented that READS has laid the foundation for future training at their companies.

READS Director reported that "During the grant period, all of the partner companies benefited their workers by supporting the READS Program financially and by offering classes all or in part on company time. The actual in-kind contribution for diverted labor costs was $86,750 or $10,350 in excess of the required amount." READS Director also reported that due to the worsening of the Connecticut economy in the latter part of the grant period, three of the four partner companies faced serious financial difficulty. This caused layoffs of both management and front line workers and put a hold on the partnership.

READS staff was totally committed to the successful outcomes of the program. This was evident in their ability to anticipate potential problems and attempt to solve them quickly; to work well as a team; to communicate effectively at all levels within the partner companies; and, to understand the different client, instructor, and participant perspectives.

5) Is there a 50% increase of the awareness of the lack of workforce literacy skills and ramifications locally and at the state level?

READS Director reported that dissemination activities included newspaper publicity, conference presentations, and a guide for developing workplace programs. I have included a list of dissemination activities in the Appendix. The news articles capture the essence and benefits of the program; the conference presentations and the guide raise the awareness of educational providers, businesses, and government agencies regarding the workplace curriculum model.

The Director also reported "...increased discussion about the need for basic skills training at local and regional Chambers of Commerce meetings. It was also discussed at the New Connecticut Conference held in October 1992."

6) Have 75% of the 335 workers (251) successfully completed training? Success will be defined as increasing one level in math and reading (as measured by the TABE), enrolling in a GED class or post-secondary education, or promotion.

190 out of 323 participants who completed the TABE or BEST, or 59%, scored greater than one level on the posttest than the pretest. 242 out of 323 participants who completed the TABE and/or BEST, or 75%, scored higher on the posttest than the pretest. 256 out of 347 participants who completed READS' courses, or 74%, are ready to advance to the next instructional level. 20 out of 347 participants who completed READS' courses, or 6%, are pursuing a GED. 23 out of 347 participants who completed READS' courses, or 7%, have been promoted.

READS did not meet the instructional goal stated in the federal grant proposal. However, one's norm-referenced test results, promotion, or course enrollment does not necessarily mean the participant can demonstrate competency. In addition, no correlation data exist to show the relationship between TABE or BEST results and the participants' job performance requirements. Also, the partner company goals were not tied to specific job performance requirements. During the program, READS staff worked closely with the partner companies to ensure that learning outcomes were directly tied to job performance and productivity levels. Consequently, as the program progressed, READS staff relied less on the norm-referenced test results for success and more on the participants' demonstration of competency of the knowledge and skills required to perform job tasks. According to READS Director, "Ironically, this change in emphasis, which was perceived as desirable and appropriate in light of certain of the grant objectives, conflicted with the primary measurable objective for participants. Their successful completion of the program was tied to improved performance on the TABE."

If refunded, READS staff could continue to refine its workplace model and build on its successes. Overall, READS was a success because of the commitment and efforts of its Director and staff, partner company representatives, instructors, and participants. Areas in need of improvement include senior management and supervisory support, refinement of the workplace curriculum model, refinement of competency-based skill assessment procedures, and ongoing staff and instructor development.

Appendix

ENGLISH AS A SECOND LANGUAGE
Participant Pre-Evaluation

Please take a moment to answer the following questions about your language skills. Your answers will help the instructor meet your learning needs. Thank you.

1. What is your job title and area of responsibility?

2. I need to develop the following skills: [please check the appropriate box(es)]

understanding technical terms	____
understanding safety issues	____
following instructions	____
understanding my job tasks	____
other (please describe)	
_____	

3. After completion of the above language skills course, I would like to be able to do the following task back on the job:

_____

_____

Your Company: _____ Date: _____

ENGLISH AS A SECOND LANGUAGE
Supervisory Pre-Evaluation of Participant

Your employee, _____, is scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled: _____.

Please take a moment to answer the following questions about the employee's language skills before participation in the above course. Your answers will help the instructor: (1) to meet the employee's learning needs, and (2) compare the employee's language skills before and after participation in the course. Please send back your completed form in the envelope provided. Thank you.

1. What is the employee's job title and area of responsibility?

2. The employee needs to develop the following skills: [please check the appropriate box(es)]

understanding technical terms	____
understanding safety issues	____
following instructions	____
understanding job tasks	____
other (please describe)	

_____

3. After completion of the above language skills course, I would like my employee to be able to do the following task back on the job: _____

_____ _____

Your Company: _____ Date: _____

ENGLISH AS A SECOND LANGUAGE
Participant Pre-Evaluation

You are scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled as follows: _____.

Please take a moment to answer the following questions. Your answers will help determine your goals in the course. Thank you.

1. What is the your job title?

2. Describe your job.

3. I need to develop the following skills: [please check the appropriate box(es)]

signing their name	____
spelling	____
filling out forms	____
understanding written information	____
understanding what others say	____
understanding words used on the job	____
finding information	____
setting goals	____
using the time clock	____
setting up machines	____
using measurement tools	____
understanding MSDS	____

other (please describe)

_____

Your Company: _____ Date: _____

ENGLISH AS A SECOND LANGUAGE
Supervisory Pre-Evaluation of Participant

Your employee, _____, is scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled: _____.

Please take a moment to answer the following questions. Your answers will help determine the employee's goals in the course. Thank you.

1. What is the employee's job title?

2. Describe the employee's job.

3. The employee needs to develop the following skills: [please check the appropriate box(es)]

signing their name	_____
spelling	_____
filling out forms	_____
understanding written information	_____
understanding what others say	_____
understanding words used on the job	_____
finding information	_____
setting goals	_____
using the time clock	_____
setting up machines	_____
using measurement tools	_____
understanding MSDS	_____
other (please describe)	

_____

Your Company: _____ Date: _____

ENGLISH AS A SECOND LANGUAGE
Participant Pre-Evaluation

You are scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled as follows: _____.

Please take a moment to answer the following questions. Your answers will help determine your goals in the course. Thank you.

1. What is the your job title?

2. Describe your job.

3. I need to develop the following skills: [please check the appropriate box(es)]

speaking English understandably	____
understanding what others say	____
understanding words used on the job	____
finding information	____
filling out forms	____
understanding written information	____
using measurement tools	____
understanding SMOPS, MQI, etc.	____
setting goals	____
setting up machines	
other (please describe)	

_____

Your Company: Pratt & Whitney - Southington Date: _____

ENGLISH AS A SECOND LANGUAGE
Supervisory Pre-Evaluation of Participant

Your employee, _____, is scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled: _____.

Please take a moment to answer the following questions. Your answers will help determine the employee's goals in the course. Thank you.

1. What is the employee's job title?

2. Describe the employee's job.

3. The employee needs to develop the following skills: [please check the appropriate box(es)]

speaking English understandably	_____
understanding what others say	_____
understanding words used on the job	_____
finding information	_____
filling out forms	_____
understanding written information	_____
using measurement tools	_____
understanding SMOPS, MQI, etc.	_____
setting goals	_____
setting up machines	
other (please describe)	

_____

Your Company: Pratt & Whitney-Southington Date: _____

Participant Pre-Evaluation

You're scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled as follows: _____.

Please take a moment to respond to the following questions regarding your current reading ability. Your responses will help the instructor: (1) tailor the course to meet your learning needs, and (2) compare your reading ability before and after participation in the course. Thank you.

1. What is your job title and area of responsibility?

2. What does the job require you to read, (for example, operating instructions, procedure manuals, supervisory memos)? _____ _____
   _____

3. Think about your ability to perform the reading skills below and check the appropriate box:

in most need of development	in least need of development	Reading Skill
____	____	understand technical terms
____	____	find information
____	____	follow instructions
____	____	interpret charts, drawings
____	____	other (please specify)
		_____

4. Approximately what percentage of your work time is devoted to performing the above reading skills? _____

5. In addition to reading skills, are there other skills in need of development, (for example, problem solving, decision making, working in teams, writing memos, presenting oral reports)? _____
   _____

6. After completion of the above reading skills course, I would like to be able to do the following task back on the job: _____
   _____

Your Company: _____ Date: _____

Supervisory Pre-Evaluation of Participant

Your employee, _____, is scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled: _____.

Please take a moment to respond to the following questions regarding the employee's reading ability on the job before participation in the above course. Your responses will help the instructor: (1) tailor the course to meet the employee's learning needs, and (2) compare the employee's reading ability before and after participation in the course. Please send back your completed form in the envelope provided. Thank you.

1. What is the employee's job title and area of responsibility?

2. What does the job require the employee to read, (for example, operating instructions, procedure manuals, supervisory memos)? _____
   _____

3. Think about the employee's ability to perform the reading skills below and check the appropriate box:

in most need of development	in least need of development	Reading Skill
____	____	understand technical terms
____	____	find information
____	____	follow instructions
____	____	interpret charts, drawings
____	____	other (please specify)

   _____

4. Approximately what percentage of the employee's work time is devoted to performing the above reading skills? _____

5. In addition to reading skills, are there other skills in need of development, (for example, problem solving, decision making, working in teams, writing memos, presenting oral reports)? _____
   _____

6. After completion of the above reading skills course, I would like my employee to be able to do the following task back on the job: _____
   _____

Your Company: _____ Date: _____

Participant Pre-Evaluation

You're scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled as follows: _____.

Please take a moment to respond to the following questions regarding your current math ability. Your responses will help the instructor: (1) tailor the course to meet your learning needs, and (2) compare your math ability before and after participation in the course. Thank you.

1. What is your job title and area of responsibility?

2. Think about your ability to perform the math skills below and check the appropriate box:

in most need of development	in least need of development	Math Skill
____	____	add, subtract, multiply, divide whole numbers, decimals, fractions, and/or percents
____	____	calculate ratios and proportions
____	____	interpret measurement scales
____	____	calculate measurements, (e.g., volume, distance, temperature, weight, time)
____	____	other (please specify) _____

3. Approximately what percentage of your work time is devoted to performing the above math skills? _____

4. In addition to math skills, are there other skills in need of development, (for example problem solving, decision making, working in teams, writing memos, presenting oral reports)? _____
_____

5. After completion of the above math skills course, I would like to be able to do the following task back on the job: _____
_____

Your Company: _____ Date: _____

Supervisory Pre-Evaluation of Participant

Your employee, _____, is scheduled to participate in the course, _____, sponsored by your company and Manchester Community College. The course is scheduled: _____.

Please take a moment to respond to the following questions regarding the employee's math ability on the job before participation in the above course. Your responses will help the instructor: (1) tailor the course to meet the employee's learning needs, and (2) compare the employee's math ability before and after participation in the course. Please send back your completed form in the envelope provided. Thank you.

1. What is the employee's job title and area of responsibility?

2. Think about the employee's ability to perform the math skills below and check the appropriate box:

in most need of development	in least need of development	Math Skill
____	____	add, subtract, multiply, divide whole numbers, decimals, fractions, and/or percents
____	____	calculate ratios and proportions
____	____	interpret measurement scales
____	____	calculate measurements, (e.g., volume, distance, temperature, weight, time)
____	____	other (please specify) _____

3. Approximately what percentage of the employee's work time is devoted to performing the above math skills? _____

4. In addition to math skills, are there other skills in need of development, (for example, problem solving, decision making, working in teams, writing memos, presenting oral reports)? _____
_____

5. After completion of the above math skills course, I would like my employee to be able to do the following task back on the job: _____
_____

Your Company: _____ Date: _____

ENGLISH AS A SECOND LANGUAGE
WORKPLACE SKILLS COURSE EVALUATION

(The instructor may conduct this evaluation verbally for ESL students with limited English proficiency.)

Today's Date_____Course Title_____
Course Date_____Instructor_____
Job Title_____Employer_____

Instructions: Please check the appropriate answer below and provide comments as directed. Your responses will help determine the value of the course.

1. How did you find out about the course?

   __a. company newsletter/brochure
   __b. supervisor/manager
   __c. human resource department
   __d. another worker
   __e. other source (please describe)_____

2. Did the instructor state the learning objectives at the beginning of the course?
   __yes __no __not sure

3. Did the course help you on the job?
   __yes __no __not sure

   Comments:

4. Was the course:
   __too fast __just right __too slow __not sure

5. Was the course:
   __too difficult __just right __too easy __not sure

6. How do you rate the instructor:
   ____excellent____good____fair____poor____not sure

   Comments:

7. In this course, I have learned to _____

8. In the course, I liked:_____

9. In the course, I did not like:_____

10. Do you have any additional comments? _____

WORKPLACE SKILLS COURSE EVALUATION

Today's Date_____Course Title_____
Course Date_____Instructor_____

Instructions: Please check the appropriate answer below and provide comments as directed. Your responses will help determine the value of the course.

1. Were the learning objectives clearly stated at the beginning of the course?
   __yes __no __not sure

2. Did the following parts of the course relate to your needs in your past job or in a job you hope to have in the future?

   a. learning objectives __yes __no __not sure __not applicable
   b. major topics __yes __no __not sure __not applicable
   c. learning activities __yes __no __not sure __not applicable
   d. handouts __yes __no __not sure __not applicable

3. How was the pace of the course?
   __too fast __just right __too slow __not sure

4. How was the level of difficulty in the course?
   __too difficult __just right __too easy __not sure

5. How do you rate the instructor in the following areas:

Area	Excellent	Good	Fair	Poor	Not sure
a. understood subject matter	__	__	__	__	__
b. understood workplace	__	__	__	__	__
c. presented clearly	__	__	__	__	__
d. encouraged independent study	__	__	__	__	__
e. encouraged work in groups	__	__	__	__	__
f. encouraged problem solving and decision making	__	__	__	__	__
g. varied learning activities	__	__	__	__	__

6. What do you feel you have learned in this course? _____
   _____
   _____
   _____
   _____

7. Overall, how valuable was the course to you for personal growth?
__very valuable __valuable __not valuable __not sure

8. Overall, how valuable was the course to you for future employment?
__very valuable __valuable __not valuable __not sure

The most valuable part of the course was _____

The least valuable part of the course was _____

9. What other courses would you like to take? _____

10. Do you have any additional comments? _____

Instructor Observations of Participants

Participant _____

Course Title _____

Course Dates/Times _____

Sponsoring Company _____

Summary of Participant's Progress

Recommendations for the Participant's Further Development

READS Program
Instructor Feedback

While it is important to receive feedback from our READS participants to determine ways in which we can improve our services, it is equally important to receive feedback from our instructors. Please take a moment to respond to the questions below and return this form with your participant surveys. Thank you.

Today's Date_____ Instructor_____

Think about the workplace basic skill development course that you just taught and decide if it was a successful or unsuccessful experience for you. Write down, in no more than half a page, the following details: (1) title, dates, times, and place of the course; (2) a description of the participants in terms of knowledge and skill level and types of jobs held; and, (3) what factors contributed to the successful or unsuccessful experience.

READS Program
Instructor Feedback, Continued

Self-evaluation

How do you rate yourself in the following areas:
(ST = Strength SA = Satisfactory NI = Needs Improvement)

Area	ST	SA	NI
knowledge of the course's subject matter	__	__	__
knowledge of the workplace, (e.g., marketplace, business mission, business plan, organizational levels)	__	__	__
knowledge of competency-based approaches to learning	__	__	__
ability to establish a climate of mutual trust and support	__	__	__
ability to create a highly participative learning environment	__	__	__
ability to relate the course to the participants' actual job tasks/ situations	__	__	__
ability to relate the course to the participants' individual learning needs	__	__	__
ability to encourage an appreciation for lifelong learning	__	__	__
ability to develop self-direction for the workplace	__	__	__
ability to develop problem solving and decision making for the workplace	__	__	__
ability to develop teambuilding for the workplace	__	__	__
ability to provide periodic feedback to the participants about their learning progress	__	__	__
ability to use different types of learning activities	__	__	__

Administration

How could we improve the administration of your course, (e.g., scheduling, location, time, materials, communication)?

ENGLISH AS A SECOND LANGUAGE
PARTICIPANT POST-EVALUATION

90 days ago, you participated in the course _____,sponsored by your company and Manchester Community College.

Please take a moment to answer to the following questions. Your answers will help determine the value of the course. Thank you.

1. What is your job title?

2. Describe your job.

3. I have developed the following skills: [please check the appropriate box(es)]

signing his/her name	_____
spelling	_____
filling out forms	_____
understanding written information	_____
understanding what others say	_____
understanding words used on the job	_____
finding information	_____
setting goals	_____
using the time clock	_____
setting up machines	_____
using measurement tools	_____
understanding MSDS	_____
other (please describe)	

_____

Your Company: _____ Date: _____

Participant Post-Evaluation

90 days ago you participated in the course, _____, sponsored by your company and Manchester Community College. Please take a moment to answer the following questions. Your responses will help the instructor evaluate your training. Thank you.

Since the completion of the above course, I: (Please check any that apply)

_____ have improved the quality of my work.
_____ feel better about myself as a worker.
_____ have accepted additional responsibilities
_____ have improved my attendance.
_____ have been promoted.
_____ have transferred to another department.
_____ have enrolled in another course.
_____ am pursuing a GED.
_____ have not changed my job performance.
_____ Other (Please describe).

_____

_____

_____

Your Company: _____ Date: _____

ENGLISH AS A SECOND LANGUAGE
Participant Post-Evaluation

90 days ago, you participated in the course _____,sponsored by your company and Manchester Community College.

Please take a moment to answer to the following questions. Your answers will help determine the value of the course. Thank you.

1. What is your job title?

2. Describe your job.

3. I have developed the following skills: [please check the appropriate box(es)]

speaking English understandably	_____
understanding what others say	_____
understanding words used on the job	_____
finding information	_____
filling out forms	_____
understanding written information	_____
using measurement tools	_____
understanding SMOPS, MQI, etc.	_____
setting goals	_____
setting up machines	_____
other (please describe)	

_____

Your Company: Pratt & Whitney - Southington Date: _____

ENGLISH AS A SECOND LANGUAGE
Supervisory Post-Evaluation Of Participant

90 days ago, your employee, _____,
participated in the course, _____,
sponsored by your company and Manchester Community College.

Please take a moment to answer to the following questions. Your answers will help determine the value of the course. Thank you.

1. What is the employee's job title?

2. Describe the employee's job.

3. The employee has developed the following skills: [please check the appropriate box(es)]

speaking English understandably	____
understanding what others say	____
understanding words used on the job	____
finding information	____
filling out forms	____
understanding written information	____
using measurement tools	____
understanding SMOPS, MQI, etc.	____
setting goals	____
setting up machines	____
other (please describe)	
_____	

Your Company: Pratt & Whitney - Southington Date: _____

ENGLISH AS A SECOND LANGUAGE
SUPERVISORY POST-EVALUATION OF PARTICIPANT

90 days ago, your employee, _____,
participated in the course, _____,
sponsored by your company and Manchester Community College.

Please take a moment to answer to the following questions. Your answers will help determine the value of the course. Thank you.

1. What is the employee's job title?

2. Describe the employee's job.

3. The employee has developed the following skills: [please check the appropriate box(es)]

signing his/her name	____
spelling	____
filling out forms	____
understanding written information	____
understanding what others say	____
understanding words used on the job	____
finding information	____
setting goals	____
using the time clock	____
setting up machines	____
using measurement tools	____
understanding MSDS	____
other (please describe)	
_____	

Your Company: _____ Date: _____

Supervisory Post-Evaluation of Participant

90 days ago, your employee, _____,
participated in the course, _____,
sponsored by your company and Manchester Community College.

Please take a moment to respond to the following questions regarding the employee's job performance after participation in the above course. Your responses will help the instructor compare the employee's skill level before and after participation. Thank you.

Since the completion of the above course, the employee: (Please check any that apply)

_____ has improved the quality of his/her work.
_____ feels better about himself/herself.
_____ has accepted additional responsibilities.
_____ has improved his/her attendance.
_____ has been promoted.
_____ has been transferred to another department.
_____ has enrolled in another course.
_____ is pursuing GED.
_____ hasn't changed his/her job performance.
_____ has been terminated.
_____ Other (Please describe).

_____
_____
_____

Your Company: _____ Date: _____

Promising Practices:

A Guide for Developing Basic Skills Training in the Workplace

Manchester Community-
Technical College
Business and Industry
Services

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Written by Ruth L. Scheer
Artwork by Steve Leshin
Manchester Community-Technical College January 1993

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Promising Practices:
A Guide for Developing Basic Skills Training In the Workplace

If you want to stay competitive:
You've got to listen to your customers!
Customize your services!
Improve your product quality!
Deliver both on time!

INTRODUCTION

As a member of the Connecticut business community producing goods or services, you have been inundated with these advisories. Whatever long-term strategy your company has adopted, it most likely will require some changes in your workplace. Implementation of these changes will be in the hands of your front-line employees. Your success will depend, in large part, on the strength and breadth of basic skills your employees have at their disposal.

The purpose of this handbook is to show you how basic skills training for front-line employees can be part of a winning strategy that will keep your company competitive. You will find promising practices here for analyzing your particular situation and for developing a program tailored to the changing needs of your company and your employees.

In case you are puzzled, let us begin by answering a few questions.

Why Basic Skills Training in the Workplace?

Historically, we have assumed that an individual holding a high school or general education diploma (GED) had adequate competency in reading, writing, and computation to function effectively and advance in a job. Your own recent experience may have led you to question this.

The recent experience of employers nationwide challenges this assumption as does a study published in 1992 by the Department of Labor (DOL) and the Educational Testing Service. The study, entitled *Beyond the School Doors*, is based on assessment of nearly 6,000 men and women primarily between the ages of 16 and 46.

Forty to 50 percent of this group, representing the 20 million who participate in DOL Job Partnership Training and Employment Programs, demonstrated very limited ability to apply reading, writing, and computation skills to tasks adults encounter in the context of work and in other aspects of their lives. Of particular concern is the fact that low-level skills were associated with a significant number of those who reported holding a high school diploma or GED certificate.

The long-term solution to the basic skills problem may be to change the approach to education in our schools and adult education programs. However, even if changes were implemented immediately, it would take a decade or more before we could expect to see the effects in the workforce.

There are other significant facts that enter into the equation. According to the frequently cited Hudson Institute Report, *Workforce 2000:*

- ***Seventy-five percent of the people who will be working in the year 2000 are already in the workforce.***

- ***New entrants into the workforce will be largely from minority and new immigrant groups who, historically, have not been well-served by our public schools. For some, English will be a second language.***

Consequently, whether your company's strategy for staying competitive involves preserving jobs in their present form, restructuring them, or creating new jobs, the basic skill competencies of the available workforce will not change now or in the foreseeable future.

In light of these realities, more and more companies are taking the initiative to expand their investment in employee education to include basic skills programs for front-line workers. In some companies, these programs are conceived as remedial and designed to solve a short-term problem. In companies which have adopted the continuous improvement philosophy, workplace education and training is conceived as part of a long-term strategy. The basic skills program is part of a continuum of education and training programs designed to promote continuous improvement and flexibility in the workforce.

What Basic Skills Are We Talking About?

We most commonly associate reading, writing, and arithmetic with the term "basic skills." Traditionally, these are the generic skills employers look for in screening job applicants. However, according to research conducted by the American Society for Training and Development during the 1980s, companies today need employees with a broader range of basic skills.

These include:

- Knowing how to learn: to be able to absorb and apply new information more quickly and efficiently.
- Competence in reading: to use prose texts and documents (charts, graphs, tables, etc.) for locating, analyzing, synthesizing, and summarizing information.
- Competence in writing: to communicate information (messages, directions, requests, replies, descriptions, etc.) clearly, accurately, and succinctly.
- Competence in applied computation and estimating skills.
- Listening and oral communication skills.
- Creative thinking and problem-solving skills.
- Interpersonal skills including the appreciation of cultural differences and the ability to be a member of a team.
- The ability to set personal and work-related goals.

For a company employing workers for whom English is a second language, the development of listening and speaking skills in English is the foundation for all other skill development.

Is Basic Skills Training Part of the Solution For Your Company?

There are a variety of situations common to companies across industries that have signalled the need for basic skills training. While concerns may differ from company to company, the following list may help you identify areas of probable need.

Problems in your workplace:

- Employees reluctant to ask questions, take initiative in solving problems, or participate in group efforts.
- Errors in how forms are filled out, memos written, records maintained.
- Too many accidents.
- Excessive scrap rate or other indications of waste.
- Lack of understanding about company procedures for calling in late or sick, for utilizing health insurance, vacation time or other benefits.
- Increasing customer complaints.
- Low enrollment in computer classes or training programs for higher level jobs.

Changes in your workplace that will require employee support:

- Introduction of new equipment or technology.
- Restructuring of existing jobs from single- to multi-skill.
- Creation of new jobs.
- Development of work teams.
- Cross-training (training employees for more than one job).
- Development of new products and/or services.
- Institution of new procedures for quality control.
- Installation of a new information management system.

If any of these apply to your company, then it is likely that basic skills training can help solve the problem or smooth the transition. Consider which basic skills are required and which basic skills might need strengthening in your workforce. Then observe, observe, and observe some more. Once you have some ideas about the ways in which basic skills training might help your company achieve its goals, it is time to share your thinking with others.

Validating the Need for a Basic Skills Program

- Introduce the concept that basic skills training might be part of the solution to specific problems at meetings with managers at all levels, supervisors, front-line workers, and union leaders.

- Sensitize key representatives from all areas in your company to the signals that suggest a need for basic skills training.

- Ask them to observe day-to-day operations with the potential basic skills solution in mind.

- Solicit feedback from your designated observers individually and in groups. Ask them to identify current and/or potential problems; together analyze the probable cause. Problems often have multiple causes; managing change usually requires multiple strategies. Basic skills training is likely to be one of the strategies that will help your company stay competitive, but it is not a panacea.

- Use this opportunity to gain support from your observers for starting a basic skills program. Involving representatives from all areas of the company in this preliminary needs assessment is the first step in marketing your program to all its stakeholders.

The In-House Marketing Campaign

This is one of the most crucial, yet most frequently overlooked, steps in the process of developing a basic skills program. Without company-wide support, a basic skills program has little chance of success.

Management must be convinced of the connection between basic skills competency in the workforce and the company's ability to have the flexibility to do what is necessary to stay competitive. When making the case to management, this connection must be made tangible. Some examples:

- If statistical process control is to be utilized in the company, do employees have sufficient math competency to participate effectively? This can affect the quality of your product.

- Do employees, for whom English is a second language, have sufficient oral communication skills to function effectively in a department or on a team where no other person speaks their native language? This can affect staffing flexibility.

- If management needs to change a process or procedure, are employees able to read a standard memo and follow directions? If employees do not understand a part of the memo, or a part of verbal directions, are they able to construct an appropriate question to get clarification? Weak communication skills can affect quality and efficiency, and can also cause accidents.

The need for upper-level management support is obvious. These are the people who must authorize payment for the expenses and diverted labor costs associated with the program. And these are the people whose commitment will be pivotal in gaining the support of supervisors.

Supervisors must be persuaded that in the long run, basic skills training will make their job easier. If supervisors do not understand the connection between basic skills competency and the ability of their front-line workers to be productive and flexible in a changing workplace, then they will not encourage their employees to participate in the program at the outset. Indeed, in crunch times, they are likely to prohibit participating employees from attending classes.

If classes are held during working hours, supervisors are the ones who will have to find alternate ways for meeting production quotas or delivering service while members of their department attend classes.

The support of ***front-line employees,*** the potential participants in your basic skills program, is essential and must be developed with great care and sensitivity. Employees are increasingly challenged by the demands of the changing nature of their work and the need to continuously improve products and services. They know better than anyone else the strengths and weaknesses they bring to their work and which skills they need to develop in order to do their jobs better.

However, unless training for all levels of employees is already a part of your workplace culture, front-line employees may anticipate there will be a stigma attached to basic skills training. They may feel embarrassed about coming forward to participate. This is particularly true if you characterize your program as remedial or as literacy training. Additionally, employees often fear that by admitting a need for help, they will be jeopardizing their employment. These issues must be addressed when soliciting support from front-line employees.

If your company has a union, the launching of a basic skills program can provide the basis for a cooperative effort between labor and management in order to achieve the mutual benefits that come with expanding and updating employees' skills. If union leaders are brought into the loop at the very beginning and have a voice in shaping the idea, they will endorse it and urge their members to do the same. In the absence of a union, front-line employees who are trusted and respected by their peers should be recruited to play the same role.

Employees are likely to welcome access to a basic skills program as an opportunity for growth and are likely to endorse the idea if:

- Basic skills training is conceived and presented as an integral part of the strategy for keeping the company competitive and not as a one-shot remediation process for individuals with skill deficiencies.

- The program is not imposed from the top down.

- Employees are represented through the union and/or directly in all stages of the planning process.

- Assurance is given that records of performance in the program will be kept strictly confidential, separate from personnel files, and will not be used as a basis for replacing workers or for evaluating them.

- Participation is voluntary.

By taking the time to market your idea to all segments of your company, you will lay the foundation for a successful collaboration among the representatives of the various groups who will be planning, implementing, and participating in your program.

Estimating the Cost

The typical line items in a Basic Skills Program Budget are:

- Program coordination (personnel).
- Literacy task analysis (personnel).
- Employee needs assessment including testing and counseling (personnel and materials).
- Curriculum development (personnel).
- Instruction (personnel, materials, and optional equipment such as computers and software).
- Evaluation (personnel and materials).
- Diverted labor costs if classes are held during working hours.
- Compensatory pay and child care costs if classes are held on personal time (may be optional).

If your company does not have in-house staff available to perform the personnel functions, investigate the Connecticut Community-Technical College in your area. All of the colleges are part of the Business and Industry Services Network which has been serving the diverse training needs of Connecticut business since 1986. The colleges can provide staff experienced in workplace education to help you assess, develop, and implement all aspects of your program.

At this point, you will not yet know the scope of your program, but you can get a cost estimate. Contact the director of Business and Industry Services at your local community-technical college and ask for a budget based on offering a single class.

Securing Financial Resources

Financial resources should be committed for the program before the planning begins. This is obligatory if you plan to contract with a community-technical college and good practice even if you are developing the program in-house. There is no point in developing a program that will never be implemented.

Some companies begin with a pilot project which represents a relatively small financial investment. Others seek partial funding, if it is available, from the Connecticut Departments of Education, Labor, or Economic Development. When there is a union involved, sometimes funding for training becomes part of the collective bargaining agreement.

Another option may be to join a consortium of companies applying for a U. S. Department of Education Workplace Literacy Grant. Successful applications for these grants have been made by Connecticut community-technical colleges and the Connecticut Business and Industry Association in partnership with a range of Connecticut companies. However, grant funding should be viewed as seed money for the start-up phase of your program and not as a permanent resource.

Organizing a Basic Skills Program Team

The Program Team is the vehicle for ensuring that all groups in your company have input into planning your program. Members may also participate in some aspects of implementation. The team serves in an advisory capacity to the education specialist and to management.

The Program Team should represent all groups in the company including managers, supervisors, front-line workers, and union leaders. Members should:

- Be knowledgeable about your company's long-term goals.
- Understand the role of basic skills training as one strategy for achieving change.
- Be trusted and respected by their peers.
- Express enthusiasm and commitment.

A representative from your Human Resources Department and your designated education specialist should also be part of your team. The education specialist will play a key role as a technical resource with knowledge of options for each element of your program.

The functions of the ProgramTeam will be to:

- Articulate program goals.
- Agree on procedures for analyzing basic skill requirements, assessing workers' needs and goals, evaluating the process and outcomes of the program.
- Address the issue of voluntary vs. mandatory participation.
- Determine the optimum time for scheduling classes.
- Participate in publicizing the program and in recruiting participants.
- Advise on the content of curriculum, relating it to the realities of your workplace.
- Keep the program visible by providing periodic updates to all stakeholder groups.

Program Coordination

The responsibility for program coordination is often given to the education specialist or human resources representative. Sometimes it is shared.

Coordination responsibilities may be divided conveniently into two parts.

1. Responsibilities of the education specialist:
    - Task Analysis.
    - Employee Assessment.
    - Counseling.
    - Curriculum Development.
    - Record Keeping.
    - Evaluation.

The education specialist may also hire and supervise teachers and organize periodic meetings with supervisors for information and feedback.

2. Responsibilities of the human resources representative:
    - Organize recruitment.
    - Find appropriate space for classes.
    - Schedule assessment and evaluation interviews.
    - Schedule classes.
    - Distribute and collect questionnaires.
    - Gather workplace materials to be incorporated into the curriculum.
    - Communicate with supervisors about release time and attendance.

Program Goals

Program goals are best conceived as one of the strategies for achieving short- and long-term company goals. For example, supposing one of your company goals is to be able to cross-train for staffing flexibility.

The team should consider:

- Which functions or departments will be affected?
- What are the steps in cross-training?
- What basic skills do employees need in order to participate effectively in cross-training?

Your answers to question #3 will become some of your program goals for the first phase of your program. In this case, some possible goals might be to:

- Develop reading, writing, and math skills.
- Improve listening and speaking skills (with special attention to those with limited English proficiency).
- Develop interpersonal skills for teamwork and appreciation of cultural differences.
- Improve problem-solving skills.
- Develop techniques for learning.

If you analyze each of your company's major goals in this way, you are likely to discover that many of the same basic skill categories will be applicable again and again.

Consequently, it is advisable to specify the purposes for which skills are being developed in each segment of your program. This will influence the choice of work-related materials incorporated in the curriculum and the development of specific learning objectives. The learning objectives will provide part of the framework for evaluating the success of your program.

It is important to remember that the goals of an education program are not synonymous with the far-reaching productivity and efficiency goals of your company. Rather, they are strategies for achieving these goals.

Your educational goals should be based on realistic expectations of what can be accomplished in the time frame allotted for learning. They also should take into account the goals employees have for themselves.

Improving skills in order to meet citizenship requirements, to help children with schoolwork, or to become a more intelligent consumer may not be directly related to the workplace. However, many companies recognize the value of goals such as these for enhancing an employee's personal development, as well as for developing basic skills transferable to the workplace.

Analyzing Basic Skill Requirements

The process of analyzing the basic skill requirements for a specific job has several names, one of which is Literacy Task Analysis. The purpose of the Literacy Task Analysis is to isolate the basic skills required in each step of a job. This information will influence the objectives and content of the curriculum.

Since frequently, it is too time consuming and too expensive to analyze every non-supervisory job in an organization, representative jobs from different categories or departments may be chosen. This decision should be made with company goals in mind and the reasons for your choices should be carefully explained to the employees involved.

A Literacy Task Analysis can be anxiety producing for employees unless they understand its purpose and are assured that the information it produces will not be used as a basis for dismissal or reduction in wages. It is essential that the team employee and/or union representative delivers this message.

A variety of methods and a variety of sources may be used for gathering information about a job:

- The education specialist and one or two others from the team observe and interview an employee in each job who is perceived to be doing the job well. (If your company has a union, the representative will want to be part of this process.)
- Others holding the same job are interviewed and asked to fill out questionnaires.
- Employees meet in groups to describe and analyze the skills they need for their job.
- Supervisors are interviewed and asked to fill out questionnaires about the job.
- Written materials such as machine and safety manuals, instruction memos, insurance policies, inventory lists, specification sheets, etc. are analyzed.

While the education specialist does the analysis, you may find it is desirable to have team members participate in observations, interviews, and group sessions to corroborate what is seen and heard and to add another perspective. Team members representing management, the union, or human resources may also supply information about why tasks have been structured in a particular way and how jobs are likely to change.

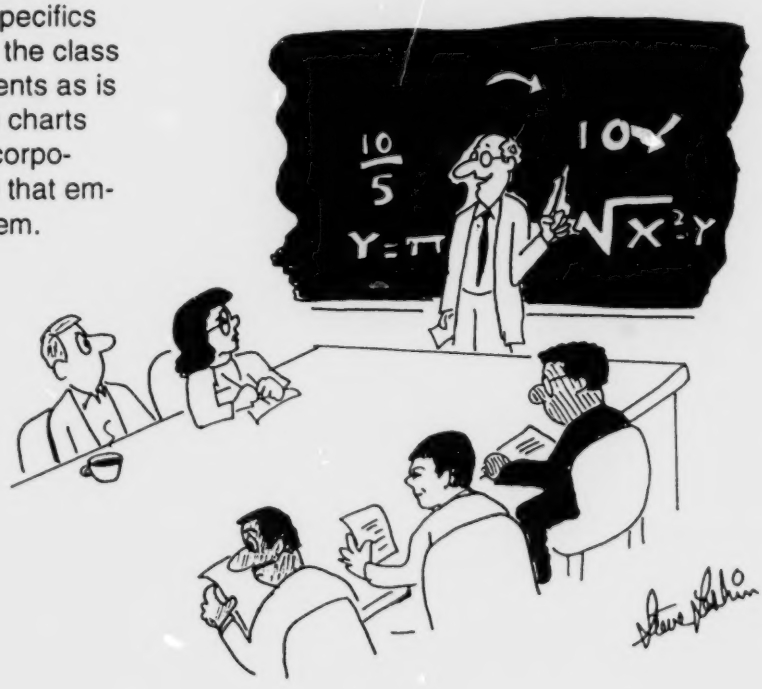
Developing a Customized Workplace Curriculum

A customized workplace curriculum is a set of learning objectives and learning activities designed to develop specific basic skills needed on the job. Though work-related, the skills are applicable to more than one job and to other aspects of daily life. The content of the curriculum (objectives, activities, and materials) is tailored to your particular workplace and to the needs of each group of participants.

So, for example, suppose one of your educational goals is to develop reading skills needed for quality control procedures. These procedures require the use of new charts and graphs which differ in specifics for each department. Members of the class are employed in different departments as is typically the case. Representative charts and graphs currently in use are incorporated into the curriculum to ensure that employees understand how to use them.

These, and other examples are used as vehicles for learning transferable skills and strategies needed to enter data and to process information related to these categories of documents. Additionally, the workplace vocabulary contained in the forms may be used to develop vocabulary-building skills to increase participants' ability to read and use unfamiliar material.

Using information from the Literacy Task Analysis, the education specialist can develop a preliminary set of learning objectives for reading and writing, math, and English as a second language. These are the skill categories most frequently addressed in the early stages of a basic skills program. The learning objectives, materials to be used, and descriptions of sample learning activities may then be reviewed by the Program Team.



Members often contribute significantly to refining and augmenting the proposed learning objectives because of their knowledge of problems or imminent changes in the way work is done. They also may have access to samples of company materials which were not covered in the task analysis. Although company materials are likely to dominate, they may be supplemented with commercially published texts.

The curriculum outlines which are produced through this process serve as a guide for instructors. Once classes are formed, information from the assessment process is used to modify the curriculum to suit the needs of the participants.

For example, supposing one of the learning objectives for a math class states: The employee will be able to calculate the percentage of the total for each item represented on a bar graph at least 80 percent of the time. Some participants may be able to read bar graphs but be unable to calculate percentages. Others may not be able to do either. The learning activities will be different for each group.

Sometimes learning activities are developed during the course of a class with response to new needs identified by a participant or supervisor. In addition, more and more basic skills programs are including real-life learning activities requested by employees. Learning to balance a checkbook or to fill out a tax form are common examples. Often, these activities serve to develop basic skills also needed in the workplace. Thus, in contrast to academic curriculums, curriculums for the workplace are modified frequently and, in a sense, the curriculum is always being developed by and for the learner.

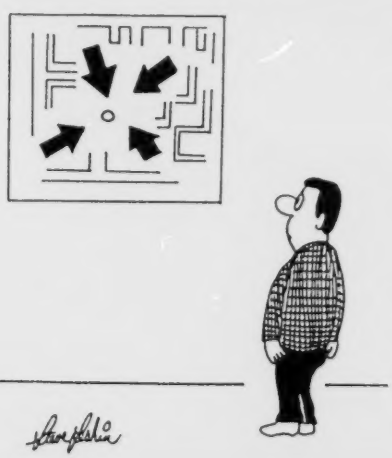
Styles of instruction in the workplace also differ from styles of instruction in traditional academic settings. There usually is less lecturing and many more activities which require the active participation of learners both individually and in cooperation with others. The goal here is to help employees develop the habit of initiating and directing their own learning.

Assessing Employee Needs and Goals

Many workplace basic skills programs use standardized tests to assess employees. Generally, these tests measure competencies in terms of academic grade levels. Such tests have proven to have limited value because they do not test competency in workplace applications of language and math skills.

Then why do standardized tests continue to be used? Standardized tests continue to be used in combination with other assessment methods because they are easy and inexpensive to administer, have been validated as being nondiscriminatory, and are designed as pre- and post-tests.

The pre- post-test design provides a means for evaluating individual progress in quantifiable academic terms which participants, management, and educators can readily understand. The recently published test, used in the Department of Labor study referred to earlier in this guide, shows promise for providing new standards for measuring work-related basic skills competency.



Some of the other assessment methods which are used to complement standardized tests include:

- **Self-assessment by participants.** In one-on-one interviews with the education specialist or a counselor, employees are guided to assess their own skills and to set their own goals for learning. If standardized or other types of tests are to be used, this is an opportunity to explain the purpose and process of testing and to reiterate that all results will remain confidential.

- **Work-related reading, writing, and arithmetic tests.** Exercises are constructed using materials from your workplace. For example, participants might be asked to summarize and answer questions about a passage from your safety manual; write a brief message for a co-worker; and use arithmetic operations to compare quantitative information on two charts.

- **Simulations.** Employees are asked to solve a problem which might be encountered in the workplace requiring the application of various basic skills.

- **Supervisor questionnaires.** These usually take the form of check lists so as not to be too time consuming. Supervisors are asked about the frequency with which specific skills are required as well as their perceptions about individual employee's competency.

The advantages of these alternate methods of assessment include: actively involving participants in the process; an assessment that becomes part of the learning process; and focusing on work-related applications of basic skills.

Separate assessment tools are used for employees with limited English proficiency. This includes one of the standardized tests specially designed to test the oral, reading, and writing skills of this population. When participant language competency permits, one-on-one interviews and simple work-related exercises are also used.

The participation of Program Team members in determining assessment tools enables them to describe the process accurately to their peers. Team members also play an important role in providing the technical and procedural information about your company which the education specialist needs to construct relevant work-related tests and simulations.

Voluntary vs. Mandatory Participation

While it may seem that required participation in an education program is the most sure-fire way to develop employee skills, the U.S. Department of Education 1992 publication, *Workplace Education: Voices From the Field,* reports that when participation is mandatory, some employees feel coerced and resentful. Since research shows that meaningful learning takes place only when the learner wants to learn and when the learner takes an active role in the process, mandatory participation can have a negative impact.

Another negative associated with mandatory participation involves possible legal considerations. According to an article in the *Business Council for Effective Literacy Newsletter,* under some circumstances, mandatory basic skills programs are governed by the Fair Labor Standards Act and Title VII of the 1964 Civil Rights Act. If you are considering a mandatory program, it is advisable to obtain legal advice.

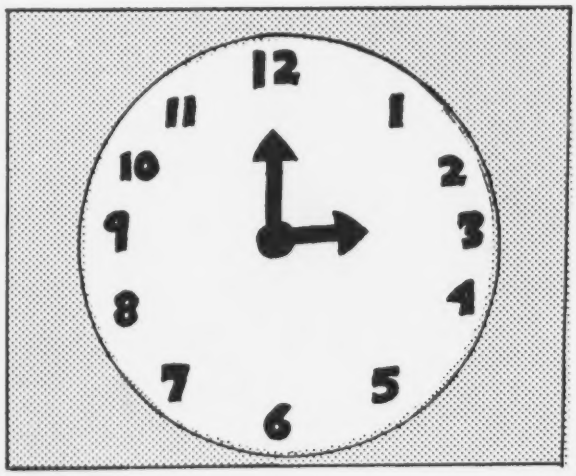
Determining the Optimum Time for Classes

While the final decision about when to schedule classes rests with management, the Program Team should analyze the pros and cons of each option and present a recommendation. Under the most favorable circumstances, classes are two hours long and meet twice a week for 12 weeks. The options for scheduling are:

1. **During the workday.** Reports from established programs indicate that levels of participation are highest when classes are scheduled on company time. The problem that must be solved is how to maintain acceptable levels of production or service delivery while some employees are in class. If this option is chosen, care should be taken not to schedule classes during periods when it is anticipated there will be intense pressure on production or service delivery.

2. **Half on company time and half on personal time.** Classes are scheduled to begin one hour before or during the last hour of the workday. This option diminishes the problem associated with option #1 but shares the problems associated with option #3.

3. **All on personal time.** Classes are scheduled during the two hours immediately before or after the workday. Employees may be unable to participate because of second jobs, lack of transportation, child care or other family responsibilities. This schedule also makes participants unavailable for overtime. As an incentive for participation, some companies pay straight or overtime wages for hours spent in class and reimburse employees for extra child-care expenses.



Recruiting Participants

Before recruitment of participants can begin, decisions must be made concerning which groups will receive training and how many employees will be served by the program during the first 12-week class cycle.

Optimum class size is between 12 and 15. Consequently, if you plan to hold classes during the workday, it is advisable to recruit participants across departments and throughout the company. This will ameliorate the problems associated with release time.

Determining the number of classes and the maximum number of participants will be influenced by your budget, the number of rooms you have available for classes, and the number of two-hour time slots you have designated for training. If your company can be flexible in relation to these issues, then the number of classes may be determined after recruitment is completed.

On the other hand, if you know you can offer only two classes and can accommodate only 30 people, this should be stated clearly during recruitment. Under these circumstances, if numbers of volunteers exceed the numbers that can be served, start a waiting list and project a timeframe for participation. Employees should be assured that everyone who is interested will have the opportunity to participate.

In the first phase of a basic skills program, separate classes are usually offered in math, reading and writing and, if appropriate, English as a second language. A decision must be made as to which of these skill areas will be covered in the first class cycle and this information should be included in recruitment publicity.

The manner in which you present your program will influence the success of your recruitment efforts. The program should be characterized as an opportunity to enhance or to update skills. If appropriate, skills development can be related to the introduction of new equipment, development of new products or services, or to total quality-continuous improvement efforts. It can be related to personal goals such as meeting job certification requirements, qualifying for a college-level course, or learning to speak and read English more fluently. The program should not be characterized as remedial or as an effort to promote literacy. Use of these words will communicate the negative and false message that your program is for those who are deficient and inadequate.

There are a number of recruitment strategies which have proven successful. The Program Team should decide which of the following are appropriate for your company and your employees:

- Post flyers in public areas and enclose with paychecks.
- Include announcements in company and union newsletters.
- Give brief oral presentations to small groups at their work-site (shop floor or office). Be prepared to answer questions.
- Staff a table in the lunchroom or near the main entrance. Hand out flyers and answer questions.
- Designate a day when employees may speak to the education specialist privately on a walk-in basis.
- Organize an informational workshop for supervisors to explain the program and to elicit their participation in recruitment.

It is most effective when employees are informed about the program and encouraged to participate by more than one person. Therefore, the education specialist, a union official, employee representative, human resource person, and supervisors should all be actively involved in the face-to-face recruitment process.

If some of your employees have limited English proficiency, printed materials should be translated into their native language. When possible, an oral presentation should also be presented in the native language, or in English by a peer from the same cultural group.

Evaluation

By taking the time to evaluate your program at the end of each class cycle, you can assess short-term results in relation to your company's long-term goals. You also can gather information that may be used to improve your program.

Evaluating your program helps you understand how well the program is meeting educational goals and the changes that have been observed in participants' on-the-job behavior.

The first step is to define standards against which actual results will be measured. One way of defining standards is to ask members of the Program Team to list the changes they will be looking for at the end of the program cycle. It is likely that some expected changes will be identified by everyone while others may be identified by only one or two members.

The education specialist may lead a discussion to produce a final list of expected changes. This should reflect the perspectives of all members of the team.

Following is a list of expected changes that might be developed for an intermediate English as a Second Language (ESL) class.

1. **Expected gains in learning:**
   - Mastery related to five learning objectives. For example, the employee will be able to locate information on an operation sheet at least 80 percent of the time.
   - Improvement by one level on a standardized test.

2. **Expected changes in on-the-job behavior and performance include improved ability to:**
   - Speak English understandably.
   - Ask questions for clarification.
   - Understand work-related vocabulary.
   - Follow oral directions.
   - Read and follow written directions.
   - Read and write a short work memo.
   - Locate information on operation sheets.
   - Recognize and demonstrate understanding of safety signs.

3. **Expected changes related to employees' personal goals include improved ability to:**
   - Communicate with health-care professionals in English and fill out required forms.
   - Understand paycheck stubs.
   - Read material for U.S. Citizenship Test.
   - Read labels and ask questions in English in the supermarket.

Each statement describing an expected change is transformed into a question and incorporated into check lists, surveys, and interviews. For example, a survey designed for supervisors might ask: Since participating in an ESL class, employee "X" has developed the ability to:

	yes	no	some
1. Speak English understandably.	__	__	__
2. Ask questions for clarification.	__	__	__
3. Understand work-related vocabulary.	__	__	__

etc.

Responses about expected changes associated with participation in the program are collected from students, supervisors, managers, union leaders, and instructors. Additional questions, such as "What other changes have you observed since the ESL class began?", often produce similar answers from many individuals and reveal unanticipated results.

Unanticipated results such as increased employee self-confidence, increased cooperation among employees, and fewer interruptions in the work flow have been reported by supervisors in the early stages of basic skills programs.

In companies with well-established programs, similar reports have been used as a basis for linking observable changes in participants' job performance to significant changes in the company as a whole.

Many companies observe improved productivity, efficiency, and safety after a basic skills program has been in operation. It is generally assumed that basic skills instruction was a factor in producing these changes.

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WORKPLACE SIMULATION

Omega Electronics Inc.

Development of a Printed Circuit Board

George Cicchetti. Ed.D.
Professor of Psychology
Mattatuck Community College

Acknowledgement to Harold Adrion

copyright 1992

Funded by Manchester Community-Technical College and Capitol Community-Technical College through a National Workplace Literacy Grant from the U.S. Department of Education.

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PRODUCTION OF PRINTED CIRCUIT BOARDS

This program simulates the production of a printed circuit board (PCB).

PRINTER ON-LINE

Please be sure that your printer is on-line. Press the print screen key to receive a print copy of each screen. You should print each screen because you will have to refer back for information necessary to complete the program.

PRINT SCREEN KEY AND PAGE UP KEY

In order to complete this program, you must use the print screen key and page up key. Read your computer manual to be sure that you understand how to use these keys.

Press the SPACE BAR to continue

USE OF CALCULATOR

You should have a hand calculator available to assist you with calculations.

* All numerical answers should have a properly placed comma.
* All money amounts should have a properly placed ($), comma and decimal point. If cent amounts are not needed, two (.00) zeroes should follow the decimal point.

Press the space bar to continue!

PRODUCTION OF OMEGA PC BOARD

This is a simulation of the production of a printed circuit board. The simulation is as realistic as possible. There are three major functions or responsibilities to complete this simulation.

1. The Buying Coordinator is responsible for purchasing materials.

2. The Labor Coordinator determines labor costs.

3. The Project Leader works with both the buyer and labor coordinator to monitor the purchasing and production processes and make necessary recommendations.
   As the simulation progresses, all members work together as a team.

Press the space bar to continue!

As you complete this simulation, you will learn to:

1. Work as a Team
2. Weigh alternatives and make decisions.
3. Use basic math operations, addition, subtraction, multiplication and division to assist your decision making.

MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

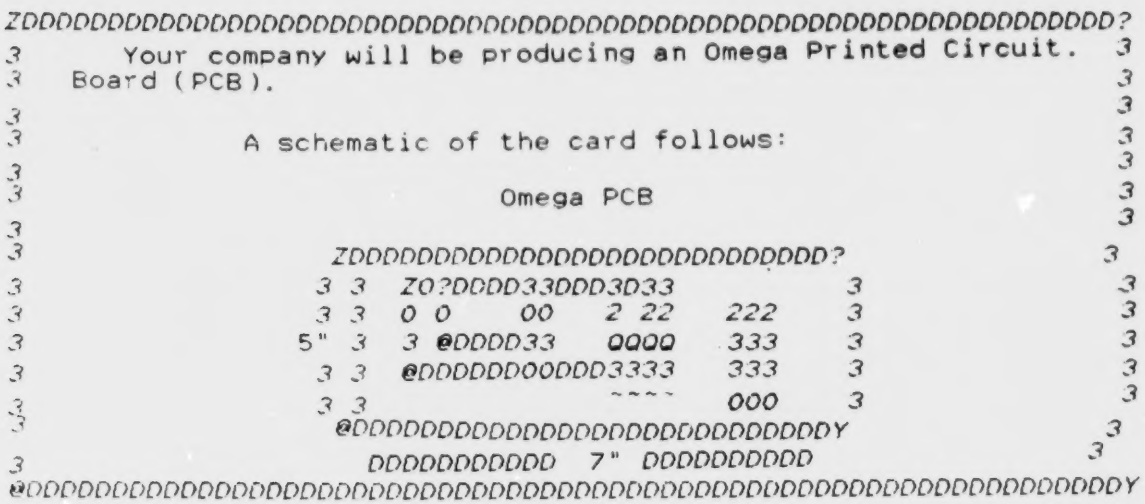
Type the buyer's name and press Enter:hoa
Type the labor coordinator's name and press Enter:tsa
Type the project leader's name and press Enter:hla
Type the date (mm/dd/yy) and press Enter:01/13/93

Press the space bar to continue!

Your company will be producing an Omega Printed Circuit. Board (PCB).

A schematic of the card follows:

Omega PCB



Press the space bar to continue!

COMPANY GOALS

1. Management has a contract to deliver 600 PC Boards within an ELEVEN week period.

2. Management has contracted to sell the PCB's for $136.00 per PC Board. The buyer should keep the total cost of materials below 2% of the contracted amount. Material and labor costs should not exceed 40% of the contracted total.

3. Materials must be purchased within four (4) weeks from the start of the contract. Approved vendors have met your company's standards for quality.

4. When all materials have been delivered, you may begin production on the printed circuit board. You may assign overtime as necessary.

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!

In order to move to the next part of this simulation, choose your role.

A. Buyer's role
B. Labor Coordinator's Role

Type the letter and press Enter:a

BUYER'S RESPONSIBILITIES

1. Purchase materials within the budgeted amount.

2. Obtain the best delivery time and material quality. You must buy 5% more material than needed for the 600 PC boards to account for breakage.

3. Obtain savings through buying in large quantities. At the same time, the company does not want to keep excessive quantities of material in inventory.

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!

TOTAL AMOUNT FOR PURCHASING

How much money do you have available for purchasing?

Type your answer and press Enter:$1,632.00

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) key to go back or Enter to continue!

How will you use the Bill of Materials (BOM) to obtain quantities?

BILL OF MATERIALS (BOM) for One Omega PCB			QTY	
PART	QUANTITY	QTY	DESCRIPTION	600
PCB	1		5" X 7" Thru Hole	?
Axial Leads	175		1 gf. .50%	?
Screws.Nuts	16		." Machine	?
Int. Circuits	14		32 PIN	?

A. Multiply the number of each part by $136.
B. Multiply each part by 630.
C. Divide $136 by each part.
D. Divide 630 by each part.

Type the letter and press Enter: b

Yes, 630 is multiplied by the number of EACH part in a PCB!

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PARTS	One PCB	TOTAL # OF PARTS
PCB	1	?
AXIAL LEAD COMP.	175	?
INT.CIRCUITS	14	?
MECH. PARTS	16	?

How many PCB's are needed?
Type your answer and press Enter:630
How many axial lead components are needed?
Type your answer and press Enter:110,250
How many integrated circuits are needed?
Type your answer and press Enter:8.820
How many mechanical parts (nuts and screws) are needed
Type your answer and press Enter:10.080

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) key to go back or Enter to continue!

Now let's look at the chart you created!

PARTS	One PCB	TOTAL # OF PARTS
PCB	1	630
AXIAL LEAD COMP.	175	110,250
INT.CIRCUITS	14	8,820
MECH. PARTS	16	10,080

You will be going next to catalogs of different vendors. Refer to this chart as you choose vendors.

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!

Vendor A (Acme Inc.)

PCB BOXES OF 50 AND 100

QUANTITY	50/bx	100/bx
COST	$2.25 per box	$4.10 per box

VENDOR ATTRIBUTES

Vendor A is approved, located in Southeast Asia and can deliver materials in 6 weeks. Add $25 for air delivery in in three weeks.

Refer to your printout for the amount to be purchased.
Include shipping cost to obtain parts in four weeks.
What will be the cost of PCB's from Vendor A ?

Type your answer and press Enter:$51.85

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) key to go back or Enter to continue!

Vendor B (Bond Company)

PCB BOXES OF 100 AND 200

QUANTITY	100/box	200/box
COST	$6.35 per box	$5.75 per box

VENDOR ATTRIBUTES

Vendor B is approved, located in Massachusetts and can deliver in 4 weeks.

Refer to your printout for the amount to be purchased.
What will be the cost of PCB's from Vendor B ?

Type your answer and press Enter:$23.60

Your response was correct.
Press the SPACE BAR.

Do you want to review Vendors A and B?
Y. Yes. I want to review.
N. No. I want to continue.

Type the letter and press Enter:n

Press the Page Up (PgUp) key to go back or Enter to continue!

Vendor C (Candex Company)

MECHANICAL PARTS Each Box has 100 Parts				VENDOR ATTRIBUTES
QUANTITY	1 bx	10 bxs	50 bxs	Vendor C is approved, located in CT and will deliver in 2 weeks.
COST	$12/bx	$8/bx	$5/bx	

Refer to your printout for the amount of mechanical parts.
The smallest quantity that can be purchased is 1 box of 100 at $12.

What will be the cost of mechanical parts from Vendor C?
Type your answer and press Enter:$512.00

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) Key to go back or Enter to continue!

Vendor D (Dandi Company)

MECHANICAL PARTS Each Box has 100 Parts	VENDOR ATTRIBUTES
QUANTITY 10 bxs 20 bxs 30 bxs	Vendor D is approved, located in NY and will deliver in 3 weeks.
COST $11/bx $8/bx $6/bx	

Refer to your printout for the amount of mechanical parts.
The smallest quantity that can be purchased is 1 box of 100 at $13.

What will be the cost of mechanical parts from Vendor D?
Type your answer and press Enter:$663.00

Your response was correct.
Press the SPACE BAR.

Do you want to review Vendors C and D?
Y. Yes. I want to review.
N. No. I want to continue

Type the letter and press Enter:n

Press the Page Up (PgUp) Key to go back or Enter to continue!

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Vendor E (Evex Company)

INTEGRATED CIRCUITS				VENDOR ATTRIBUTES
QUANTITY	200/bx	300/bx	400/bx	Vendor E is approved, located in Taiwan. and will take six weeks to deliver. Add $200 for delivery by air within 2 weeks.
COST	$5/bx	$4/bx	$2.90/bx	

Refer to your printout for the amount of integrated circuits.
The smallest quantity that can be purchased is 1 box of 200 at $5.00.

What will be the cost of mechanical parts from Vendor E?
Include shipping cost to obtain material within 4 weeks.

Type your answer and press Enter:$266.70

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) key to go back or Enter to continue!

Vendor F (Fensak Company)

INTEGRATED CIRCUITS QUANTITIES			VENDOR ATTRIBUTES
QUANTITY	200/bx	300/bx	400/bx	Vendor F is approved, located in Japan, and will take six weeks to deliver. Add $200 for air delivery which cuts delivery time in half.
COST	$7.50/bx	$5.10/bx	$3.00/bx	

Refer to your printout for quantities of integrated circuits.
Include shipping cost to obtain material within 4 weeks.
What will be the cost of integrated circuits from Vendor F ?

Type your answer and press Enter:$269.00

Your response was correct.
Press the SPACE BAR.

Do you want to review Vendors E and F?
Y. Yes. I want to review.
N. No. I want to continue

Type the letter and press Enter:n

Press the Page Up (PgUp) key to go back or Enter to continue

Vendor G (Gandy Company)

AXIAL LEADS QUANTITIES

QUANTITY	1000/bx	2000/bx	3000/bx
COST	$1.00/bx	$.50/bx	$.40/bx

VENDOR ATTRIBUTES

Vendor G is approved, located in Japan, and will take six weeks to deliver. Add $50 for air delivery which cuts delivery time in half.

Refer to your printout for quantities of axial leads.
The smallest amount that can be purchased is a lot of 1000.
Include shipping cost to obtain material within 4 weeks.

What will be the cost of axial leads circuits from Vendor G?
Type your answer and press Enter:$64.80

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) key to go back or Enter to continue!

Vendor H (Hanzi Company)

AXIAL LEADS QUANTITIES

```
ZDDDDDDDDDDBDDDDDDDDBDDDDDDDBDDDDDDD?
3 QUANTITY 3 1000/bx32000/bx33000/bx3
@DDDDDDDDDDEDDDDDDDDFDDDDDDDEDDDDDDD4
  COST       3$1.25/bx3$.75/bx3$.35/bx3
             @DDDDDDDDADDDDDDDADDDDDDDY
```

VENDOR ATTRIBUTES

Vendor H is approved, located in California and will take three weeks to deliver. Add $200 for delivery which cuts delivery time in half.

Refer to your printout for quantities of integrated circuits.
The smallest amount that can be purchased is a box of 1000.

What will be the cost of axial leads from Vendor H ?

Type your answer and press Enter:$12.95

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
:
:                          Your response was correct.
:                             Press the SPACE BAR.
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
```

Do you want to review Vendors G and H?
Y. Yes. I want to review.
N. No. I want to continue

Type the letter and press Enter:n

Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                          Purchase Order                                  3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
  Complete this form and press Enter after each entry.

                        Item: Printed Circuit Boards (PCB's)

  Vendor:b
  Location:Massachusetts
  Cost:$23.60
  Delivery Time:4 weeks
```

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                        Press the SPACE BAR to continue                    *
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ÚÄÄÄ
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ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                          Purchase Order                               3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
  Complete this form and press Enter after each entry.

                        Item: Integrated Circuits

  Vendor:e
  Location:Taiwan
  Cost:$266.70
  Delivery Time:3 weeks
```

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[MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
:                                                                      :
:                      Press the SPACE BAR to continue                 :
:                                                                      :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
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ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                          Purchase Order                                  3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
  Complete this form and press Enter after each entry.

                              Item: Axial Leads

  Vendor:h
  Location:California
  Cost:$12.95
  Delivery Time:3 weeks

  Production can not begin until ALL parts have been delivered.
  How many weeks does production have to complete the project.
  Production time:7 weeks
  Total cost of materials:$815.25

IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                           :
:                        Press the SPACE BAR to continue                    :
:                                                                           :
@MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
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BEST COPY AVAILABLE

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DDDD
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```
Do you want to continue or end this program?
  Y. Yes, I want to continue the program.
  B. No, I want to end the program.

Type the letter and press Enter:y
```

LABOR COORDINATOR

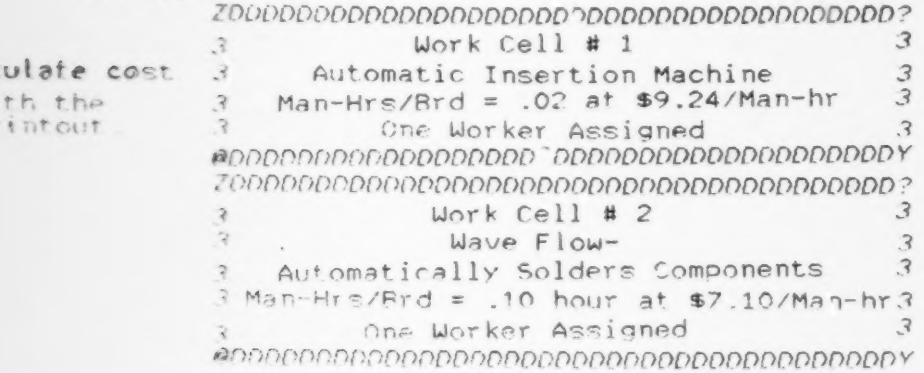
The standard labor loads and unit cost have been broken down into 10 Work Cells (WC). The Labor Coordinator must determine:

1. The number of labor hours per work cell and cost.
2. The need for overtime and the cost of overtime. The company can not afford to hire and train new workers.
3. There are fourteen workers in the department. Some work cells are assigned more than one worker. Assign overtime for work cells that are most labor intensive.

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!

There are ten WORK CELLS or specific jobs in the work route. The following flow chart illustrates the route:



Calculate cost with the printout

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 3                3
3        Log Point - Maps Integrated        3
3          Circuits and Axial Leads         3
3 Man-Hrs/Brd = .05 hour at $8.35/Man-hr    3
3           One Worker Assigned             3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 4                3
3             Hand Solder Parts             3
3 Man-Hrs/Brd = .80 hour at $6.80/Man-hr    3
3           Two Workers Assigned            3
@DDDDDDDDDDDDDDDDDDDD~DDDDDDDDDDDDDDDDDDDDY
```

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue.

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                  Work Cell # 5                     3
3              Mechanical Assembly                   3
3                  of Hardware                       3
3 Man-Hrs/Brd = 1.25 hrs. at $6.25/Man-hr            3
3              Two Workers Assigned                  3
@DDDDDDDDDDDDDDDDDDDDD~DDDDDDDDDDDDDDDDDDDDY
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                  Work Cell # 6                     3
3                  Automatic Test                    3
3            Computerized Test of Board              3
3 Man-Hrs/Brd = .08 hour at $12.35/Man-hr            3
3              One Worker Assigned                   3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 7                  3
3          Manual Test of Board               3
3  Man-Hrs/Brd = 1 hour at $13.25/Man-hr      3
3          Two Workers Assigned               3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 8                  3
3          Automatic Lead Cutting             3
3 Man-Hrs/Brd = .08 hour at $9.07/Man-hr      3
3            One Worker Assigned              3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!

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ZDDD
```

For each work cell calculate the following:

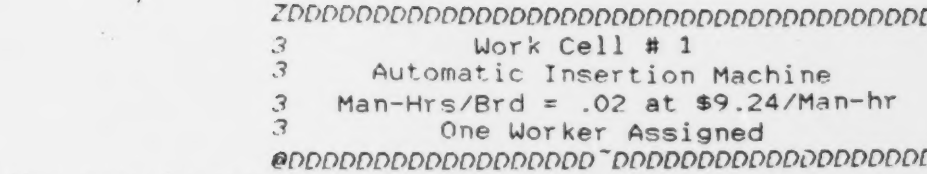
1. The total elapsed time in hours required so that any needed overtime can be determined. Elapsed time is the time period required, start to end, to produce 600 PCBs.

2. The straight time labor cost to produce 600 PCBs.

3. Overtime labor costs for those work cells which need more than 280 hours (7 weeks) of elapsed time. Overtime rates are 1 1/2 times the straight time hourly rates.

Press the space bar to continue!

Press the Page Up (PgUp) key to go back or Enter to continue!



How many boards per hour can be produced by Work Cell 1 ?
Type your answer and press Enter:50
How much elapsed time in hrs. will Work Cell 1 need to produce 600 PCBs?
Type your answer and press Enter:12
What is the straight time labor cost for Work Cell 1 ?
Type your answer and press Enter:$110.88

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) Key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 2                3
3               Wave Flow-                  3
3    Automatically Solders Components       3
3 Man-Hrs/Brd = .10 hour at $7.10/Man-hr    3
3          One Worker Assigned              3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

How many boards per hour can be produced by Work Cell 2 ?
Type your answer and press Enter:10
How much elapsed time in hrs. will Work Cell 2 need to produce 600 PCBs ?
Type your answer and press Enter:60
What is the straight time labor cost for Work Cell 2 ?
Type your answer and press Enter:$426.00

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                               :
:                        Your response was correct.                             :
:                          Press the SPACE BAR.                                 :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
```

Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 3                 3
3        Log Point - Maps Intograted         3
3         Circuits and Axial Leads           3
3 Man-Hrs/Brd = .05 hour at $8.35/Man-hr     3
3          One Worker Assigned               3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

How many boards per hour can be produced by Work Cell 3 ?
Type your answer and press Enter:20
How much elapsed time in hrs. will Work Cell 3 need to produce 600 PCBs ?
Type your answer and press Enter:30
What is the straight time labor cost for Work Cell 3 ?
Type your answer and press Enter:$250.50

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I;;;
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ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                Work Cell # 4                3
3              Hand Solder Parts              3
3 Man-Hrs/Brd = .80 hour at $6.80/Man-hr 3
3             Two Workers Assigned            3
@DDDDDDDDDDDDDDDDDDD~DDDDDDDDDDDDDDDDDDDDY
```

How many boards per hour can be produced by Work Cell 4 ?
   Type your answer and press Enter:2.5
How much elapsed time in hrs. will Work Cell 4 need to produce 600 PCBs ?
   Type your answer and press Enter:240
What is the straight time labor cost for Work Cell 4 ?
   Type your answer and press Enter:$3,264.00

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                                               :
:                                  Your response was correct.                                   :
:                                    Press the SPACE BAR.                                       :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
```

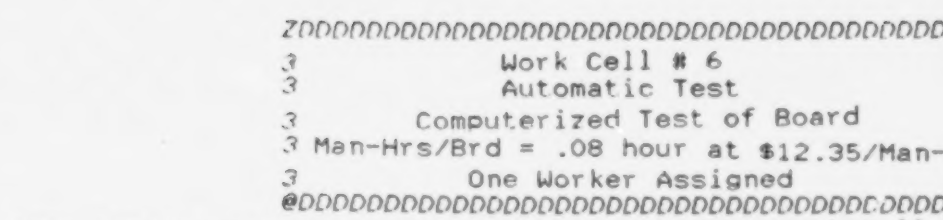
Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDD
```

Do you want to review Work Cells 1 through 5 ?

Y. Yes. I want to review.
N. No. I want to continue

Type the letter and press Enter:n



How many boards per hour can be produced by Work Cell 6 ?
Type your answer and press Enter:12.5

How much elapsed time in hrs. will Work Cell 6 need to produce 600 PCBs ?
Type your answer and press Enter:48

What is the straight time labor cost for Work Cell 6 ?
Type your answer and press Enter:$592.80

Your response was correct.
Press the SPACE BAR.

Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 7                3
3           Manual Test of Board            3
3   Man-Hrs/Brd = 1 hour at $13.25/Man-hr   3
3           Two Workers Assigned            3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

How many boards per hour can be produced by Work Cell 7 ?
Type your answer and press Enter:2

How much elapsed time in hrs. will Work Cell 7 need to produce 600 PCBs ?
Type your answer and press Enter:300

What is the straight time labor cost for Work Cell 7 ?
Type your answer and press Enter:$7,950.00

```
[MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                                          :
:                          Your response was correct.                                      :
:                            Press the SPACE BAR.                                        *:
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM(
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Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                  Work Cell # 8                  3
3              Automatic Lead Cutting             3
3 Man-Hrs/Brd = .08 hour at $9.07/Man-hr          3
3              One Worker Assigned                3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

How many boards per hour can be produced by Work Cell 8 ?
Type your answer and press Enter:12.5

How much elapsed time in hrs. will Work Cell 8 need to produce 600 PCBs ?
Type your answer and press Enter:48

What is the straight time labor cost for Work Cell 8 ?
Type your answer and press Enter:$435.36

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                                     :
:                          Your response was correct.                                 :
:                            Press the SPACE BAR.                                     *
HMMMMMMMMMMMM4MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
```

Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 9                  3
3                Inspection                   3
3 Man-Hrs/Brd = .80 hr at $10.15/Man-hr       3
3           Two Workers Assigned               3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

How many boards per hour can be produced by Work Cell 9 ?
Type your answer and press Enter:2.5

How much elapsed time in hrs. will Work Cell 9 need to produce 600 PCBs ?
Type your answer and press Enter:240

What is the total labor cost for Work Cell 9 ?
Type your answer and press Enter:$4,872.00

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                                          :
:                          Your response was correct.                                      :
:                            Press the SPACE BAR.                                          :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM(
```

Press the Page Up (PgUp) key to go back or Enter to continue!

```
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3              Work Cell # 10                3
3                 Packaging                  3
3 Man-Hrs/Brd = .50 hr at $11.17/Man-hr  3
3              One Worker Assigned           3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
```

How many boards per hour can be produced by Work Cell 10 ?
Type your answer and press Enter:2

How much elapsed time in hrs. will Work Cell 10 need to produce 600 PCBs ?
Type your answer and press Enter:300

What is the straight time labor cost for Work Cell 10 ?
Type your answer and press Enter:$3,351.00

```
;MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                               :
:                          Your response was correct.                           :
:                            Press the SPACE BAR.                               :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
```

Do you want to review Work Cells 6 through 10 ?

Y. Yes, I want to review.
N. No. I want to continue.

Type the letter and press Enter:n

OVERTIME DECISION

Decide whether you can meet the production deadline within the existing working hours and current workers.

Important Note The cells that require the most labor time per board should be considered for overtime.

There is a seven week production period. An elapsed time of more than 280 hrs. for a particular work cell will require overtime costs.

If there is a need for overtime, decide which work cells MUST be given overtime, the amount of overtime hours and compute the cost of overtime.

Press the SPACE BAR to continue

ZDDD

```
The PROJECT LEADER must calculate the direct material
cost and the direct labor cost.
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3                              PROJECT LEADER                                    3
@DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY

PROJECT LEADER: hla
DATE: 01/13/93
Complete this form and press Enter after each entry.
Use the backspace and delete key to erase.
ZDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?

BUYER: hoa
Direct Material Cost:$815.25
LABOR COORDINATOR tsa
Direct Labor Cost:$26,910.49
Total Estimate:$27,725.74
Did the total cost of material and labor fall within
40% of the contracted total of $81,600?yes: allowed--$32,640.00
          Thank you.  Press the space bar to end the program.
```

Appendix

Workplace Simulation

Calculations

This appendix presents the detailed calculations which are required to complete the WORKPLACE SIMULATION, "Development of a Printed Circuit Board." The reasoning behind each calculation is also presented.

Page 10

Total amount for purchasing:

The materials costs are to be kept below 2% of the contracted amount. (see page 7)

600 boards are to be delivered at $136.00 per board. (see page 7)

Contracted amount = 600 boards X $136/board = $81,600.00

$81,600.00 X .02 = $1632.00

Page 12

Remember! To account for breakage, 5% more material must be purchased than is needed for 600 boards.

How many PCB's are needed?
600 boards X 1 PCB/board X 1.05 = 630 PCB's

How many axial leads are needed?
600 boards X 175 leads/board X 1.05 = 110,250 axial leads

How many integrated circuits are needed?
600 boards X 14 IC's/board X 1.05 = 8,820 IC's

How many mechanical parts are needed?
600 boards X 16 parts/board X 1.05 = 10,080 parts

Page 14

Cost of 630 PCB's from Vendor A

6 boxes x $4.10/box + 1box x $2.25/box + $25.00 shipping = $51.85

Page 15

Cost of 630 PCB's from Vendor B

3 boxes x $5.75/box + 1box x $6.35/box = $23.60

NOTE: 4 boxes X $5.75/box = $23.00
but, excess unused inventory results

Page 16

Cost of 10,080 mechanical parts from Vendor C

100 boxes x $5.00/box + 1 box x $12.00/box = $512.00

Page 17

Cost of 10,080 mechanical parts from Vendor D

90 boxes x $6.00/box + 10 boxes x $11.00/box + 1 box x $13.00/box = $663.00

Page 18

Cost of 8,820 integrated circuits from Vendor E

23 boxes x $2.90/box + $200.00 shipping = $266.70

Page 19

Cost of 8,820 integrated circuits from Vendor F

23 boxes x $3.00/box + $200.00 shipping = $269.00

Page 20

Cost of 110,250 axial leads from Vendor G

37 boxes x $0.40/box + $50.00 shipping = $64.80

Page 21

Cost of 110, 250 axial leads from Vendor H

37 boxes x $0.35/box = $12.95

Pages 22 - 25

Purchase Order

The Purchase Order is made up by choosing the lowest cost vendor for each of the four different components purchased.

page 22	PCB's	Vendor B	$23.60
page 23	Mechanical parts	Vendor C	$512.00
page 24	IC's	Vendor E	$266.70
page 25	Axial Leads	Vendor H	$12.95
	page 25 - Total cost of materials		$815.25

Page 34

Labor Costs

It is necessary to calculate the elapsed time required for each Work Cell so that any needed overtime can be determined. Any elapsed time extending beyond 7 weeks, or 7 weeks X 40 hours/week = 280 hours, must be overtime.

Page 35 Work Cell #1

Boards per hour

$$\frac{1}{.02 \frac{\text{man-hrs}}{\text{board}}} = 50 \frac{\text{boards}}{\text{man-hour}} \times 1 \text{ man} = 50 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{50 \frac{\text{boards}}{\text{hour}}} = 12 \text{ hours elapsed time}$$

Straight time labor cost

$$12 \text{ hours} \times \frac{\$9.24}{\text{man-hour}} \times 1 \text{ man} = \$110.88$$

Page 36 Work Cell #2

Boards per hour

$$\frac{1}{.10 \frac{\text{man-hrs}}{\text{board}}} = 10 \frac{\text{boards}}{\text{man-hour}} \times 1 \text{ man} = 10 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{10 \frac{\text{boards}}{\text{hour}}} = 60 \text{ hours elapsed time}$$

Straight time labor cost

$$60 \text{ hours} \times \frac{\$7.10}{\text{man-hour}} \times 1 \text{ man} = \$426.00$$

Page 37 Work Cell #3

Boards per hour

$$\frac{1}{.05 \frac{\text{man/hrs}}{\text{board}}} = 20 \frac{\text{boards}}{\text{man-hour}} \times 1 \text{ man} = 20 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{20 \frac{\text{boards}}{\text{hour}}} = 30 \text{ hours elapsed time}$$

Straight time labor cost

$$30 \text{ hours} \times \frac{\$8.35}{\text{man-hour}} \times 1 \text{ man} = \$250.50$$

Page 38 Work Cell #4 (2 workers)

Boards per hour

$$\frac{1}{.80 \frac{\text{man-hours}}{\text{board}}} = 1.25 \frac{\text{boards}}{\text{man-hour}} \times 2 \text{ men} = 2.5 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{2.5 \frac{\text{boards}}{\text{hour}}} = 240 \text{ hours elapsed time}$$

Straight time labor cost

$$240 \text{ hours} \times \frac{\$6.80}{\text{man-hour}} \times 2 \text{ men} = \$3267.00$$

Page 39 Work Cell #5 (2 workers)

Boards per hour

$$\frac{1}{1.25 \frac{\text{man-hours}}{\text{board}}} = 0.8 \frac{\text{boards}}{\text{man-hour}} \times 2\text{men} = 1.6 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{1.6 \frac{\text{boards}}{\text{hour}}} = 375 \text{ hours elapsed time}$$

overtime = 375 hrs − 280 hrs = 95 hours

Straight time labor cost

$$375 \text{ hours} \times \frac{\$6.25}{\text{man-hour}} \times 2\text{men} = \$4687.50$$

Page 41 Work Cell #6

Boards per hour

$$\frac{1}{.08 \frac{\text{man-hours}}{\text{board}}} = 12.5 \frac{\text{boards}}{\text{man-hour}} \times 1\text{man} = 12.5 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{12.5 \frac{\text{boards}}{\text{hr}}} = 48 \text{ hours elapsed time}$$

Straight time labor cost

$$48 \text{ hours} \times \frac{\$12.35}{\text{man hour}} \times 1\text{man} = \$592.80$$

Page 42 Work Cell #7 (2 workers)

Boards per hour

$$\frac{1}{1 \frac{\text{man-hour}}{\text{board}}} = 1 \frac{\text{board}}{\text{man-hour}} \times 2\text{men} = 2 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{2 \frac{\text{boards}}{\text{hour}}} = 300 \text{ hours elapsed time}$$

overtime = 300 hrs − 280 hrs = 20 hours

Straight time labor cost

$$300 \text{ hours} \times \frac{\$13.25}{\text{man-hour}} \times 2\text{men} = \$7950.00$$

Page 43 Work Cell #8

Boards per hour

$$\frac{1}{.08 \frac{\text{man-hour}}{\text{board}}} = 12.5 \frac{\text{boards}}{\text{man-hour}} \times 1\text{man} = 12.5 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{12.5 \frac{\text{boards}}{\text{hour}}} = 48 \text{ hours elapsed time}$$

Straight time labor cost

$$48 \text{ hours} \times \frac{\$9.07}{\text{man-hour}} \times 1\text{man} = \$435.36$$

Page 44 Work Cell #9 (2 workers)

Boards per hour

$$\frac{1}{.80 \frac{\text{man-hours}}{\text{board}}} = 1.25 \frac{\text{boards}}{\text{man-hour}} \times 2 \text{ men} = 2.5 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{2.5 \frac{\text{boards}}{\text{hour}}} = 240 \text{ hours elapsed time}$$

Straight time labor cost

$$240 \text{ hours} \times \frac{\$10.15}{\text{man-hour}} \times 2 \text{ men} = \$4872.00$$

Page 45 Work Cell #10

Boards per hour

$$\frac{1}{.50 \frac{\text{man-hours}}{\text{board}}} = 2 \frac{\text{boards}}{\text{man-hour}} \times 1 \text{ man} = 2 \frac{\text{boards}}{\text{hour}}$$

Elapsed time

$$\frac{600 \text{ boards}}{2 \frac{\text{boards}}{\text{hour}}} = 300 \text{ hours elapsed time}$$

overtime = 300 hrs - 280 hrs = 20 hours

Straight time labor cost

$$300 \text{ hours} \times \frac{\$11.17}{\text{man-hour}} \times 1 \text{ man} = \$3351.00$$

Page 48

Straight-Time Labor Cost for Work Cells #1 through #10

Work Cell #1	$110.88
#2	$426.00
#3	$250.50
#4	$3264.00
#5	$4687.50
#6	$592.80
#7	$7950.00
#8	$435.36
#9	$4872.00
#10	$3351.00

Straight Time Labor Cost = $25940.04

Work Cells Requiring Overtime

Work Cell #5	95 hours elapsed time
Work Cell #7	20 hours elapsed time
Work Cell #10	20 hours elapsed time

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Calculation of Overtime Labor Cost

Overtime labor rates are 1½ straight-time labor rates

Note that the straight-time labor costs for the overtime elapsed hours of Work Cells #5, #7 and #10 were calculated above for the individual work cell calculations.

It remains only to calculate the costs for those overtime hours at ½ the straight time rates.

Work Cell #5

375 hours - 280 hours = 95 hours of overtime

$95 \text{ hours} \times \frac{\$6.25}{2} \frac{1}{\text{man-hour}} \times 2 \text{ men} = \$593.75$

Work Cell #7

300 hours - 280 hours = 20 hours of overtime

$20 \text{ hours} \times \frac{\$13.25}{2} \frac{1}{\text{man-hour}} \times 2 \text{ men} = \$265.00$

Work Cell #10

300 hours - 280 hours = 20 hours of overtime

$20 \text{ hours} \times \frac{\$11.17}{2} \frac{1}{\text{man-hour}} \times 1 \text{ man} = \$111.70$

Additional Labor Cost for Overtime

Work Cell #5	$593.75
#7	$265.00
#10	$111.70
	$970.45

Page 49 Direct Labor Cost

straight time	$25940.04
overtime	$970.45
	$26910.49

Total Cost Estimate

materials	$815.25
direct labor	$26910.49
Total Estimate	$27725.74

Allowable Budget 40% of contracted total (see page7)

Contracted total = 600 boards X $136/board = $81,600.00

Allowable budget = $81,600.00 X .40 = $32,640.00